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ABSTRACT

This document lists and discusses the development of Maryland's performance specifications for occupational programs. The introduction explains the process used to develop performance standards and specifications for 10 career cluster majors that were identified by a task force of educators and employers as high-demand occupational areas in Maryland and were approved by a verification work group consisting of occupational and academic teachers from 12 Maryland counties and representatives of 28 Maryland businesses. Potential uses of the performance specifications by educators/trainers, workers, and businesses are listed. Appendixes constituting more than 90% of the document contain profiles of Maryland's programs to prepare students for employment in the following occupational areas: allied health; bioscience technician; computer-aided drafting and design; carpentry; child care and guidance; electronics; graphic communication and printing; heating, air conditioning, and refrigeration mechanics; horticulture; and secretarial and related programs. Each profile includes the following: program cluster; program title; program description; and identified occupational, foundation, and workplace skills. (MN)

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ED 386 598

MARYLAND STATE DEPARTMENT OF EDUCATION

PERFORMANCE SPECIFICATIONS for OCCUPATIONAL PROGRAMS

Prepared under the direction of the Division of Career Technology and Adult Learning 200 West Baltimore Street Baltimore, Maryland 21201

CE 069 896

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Occupational and academic teachers from the following counties participated in the verification work group:

ANNE ARUNDEL
BALTIMORE CITY
BALTIMORE COUNTY
CALVERT COUNTY
CARROLL COUNTY
FREDERICK COUNTY
GARRETT COUNTY
HOWARD COUNTY
MONTGOMERY COUNTY
PRINCE GEORGE'S COUNTY
ST. MARY'S COUNTY
TALBOT COUNTY

Businesses who sent participants to the verification work group:

AAA HEATING AND AIR CONDITIONING
AMERICAN RED CROSS
AMERICAN TRADE BINDERY
BALLY'S HEALTH CLUBS
BALTIMORE COLORPLATE
BEHNKE NURSERIES
BIOCON
BIO SCIENCE CONTRACT PRODUCTION
BLAKEHURST RETIREMENT CENTER
CIRCUIT CITY
CREATIVE LEARNING
DUTTERER'S FLOWER SHOP, INC.
ENVIRONMENTAL ENGINEERING
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MY SECOND HOME
PREAKNESS HOMES
PROFESSIONAL TEMPORARIES
ST. JOSEPH'S HOSPITAL
SEVERNA PARK CHILDREN'S CENTER
SINAI HOSPITAL
SUBURBAN MARYLAND BUILDING ASSOCIATION
TENDER CARE
WHITMORE PRINTING
WHITNEY BAILEY COX AND MAGNANI

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Introduction

Beginning in January 1994, a Program Standards Task Force involving educators and employers was established to develop new standards and specifications for the following 10 career cluster majors identified as high demand occupational areas in Maryland: Allied Health; Biological Technology/Technician; Construction/Carpentry; Child Care and Guidance; Drafting; Electronics; Graphics and Printing Communication; Heating, Air Conditioning, and Refrigeration Mechanics; Horticulture; and Secretarial and Related Programs. Initial outcomes were identified for validation using voluntary national skill standards where available and the most recent employer-validated task lists found in DACUM (Developing A CurriculUM) charts, V-TECS (Vocational-Technical Education Consortium of States) and other sources.

The task force created a process to ensure that the performance specifications are consistent with the workforce preparation needs projected for the twenty-first century. The new performance specifications enable educators to work with employers to create flexible and dynamic programs that are responsive to economic development needs. They focus on outcomes as well as content and clearly delineate all aspects of the industry. They emphasize technical and academic preparation, as well as employability skills. To include all aspects of the industry, instruction should contain planning, management, finances, technical and production skills, underlying principles of technology, labor issues, and health and safety.

Initially, the task force developed a prototype of the components of the new performance specifications and determined how the process would be used to redesign the specifications for nine established career cluster areas: Consumer Service; Hospitality and Tourism; Health and Biosciences; Business Management and Finance; Arts, Media, and Communication; Human Resource Services; Environmental and Natural Resource Systems; Manufacturing, Engineering and Technology; Transportation Technologies; and Construction and Development. The performance specifications were established to complement curriculum development, instruction, and assessment strategies. They are electronically stored and retrieved through computer software, enabling the performance specifications to be validated and regularly updated by employers in cooperation with educators at state and local levels.

In May 1995, under the leadership of MSDE, Industry/Education Advisory Groups were convened to verify technical, academic and employability skills for the 10 identified career cluster majors. The two-day verification process involved 32 industry representatives and 38 teachers on teams consisting of four industry representatives and four teachers, two from the career area and two from the academic or foundation skills areas. This product contains the results of that meeting. These documents will be made available to educators and other interested parties in both hard copy and disk format. They will be used to guide the development of curriculum assessments and instruction leading to the issuance of skill certificates in Maryland's School-to-Careers system. For further information on these products, contact Doris Sharkey, Project Coordinator, Maryland State Department of Education, Division of Career Technology and Adult Learning, 200 West Baltimore Street, Baltimore, Maryland 21201, phone (410) 767-0185, fax (410) 333-2099.

USES FOR PERFORMANCE SPECIFICATIONS

PERFORMANCE SPECIFICATIONS identify the knowledge, skills, and abilities an individual needs to succeed in the workplace. They define a common language of quality and expectations for everyone—employers, employees, job seekers, educators, and human resource managers.

Performance Specifications provide lines of communication between:

- ✓ Business and schools—to align school curricula with industry requirements, to update educational objectives as workplace demands change, and to ensure a better return on public and private training investments.
- ✓ Workers and schools—to help workers take responsibility for and make sound decisions about their own training.

For educators and trainers, performance specifications:

- ✓ Provide a framework for curriculum development.
- ✓ Clarify the technical and academic skills needed for employment.
- ✓ Provide more complete career information to students and families.
- ✓ Ease the school-to-work transition.
- ✓ Attract industry involvement.

For workers, performance specifications:

- ✓ Make explicit employer's expectations for hiring, performing, and career advancement.
- ✓ Help employees identify and prioritize their own training needs.
- ✓ Enhance employees' own employment security by creating a portable portfolio of industry-approved skills and credentials.

For business, performance specifications:

- ✓ Align individual skills with business' missions, visions, values, strategies, and goals.
- ✓ Boost productivity and competitiveness by increasing work flexibility.
- ✓ Reduce the costs of assessing job candidates, and reduce turnover by hiring candidates with known skills.
- ✓ Set a common school-to-careers agenda for educators and trainers--internal and external.

Excerpted with permission - National Alliance of Business, **Skill Standards - Benchmarks of Excellence, 1995, pp.4-6**

General Information

These performance specifications are just the beginning of any good curriculum plan. The intention is that they be locally validated and, in conjunction with partners, used as articulation vehicles for Tech Prep programs or for apprenticeship agreements. They can be used to establish school-based and work-based learning agreements with business and industry partners.

Because of our interest in using state-of-the-art task lists and skills standards, the language is not parallel in all the lists. The intent was to validate and publish the most up-to-date lists available at this time. These lists will be reviewed periodically to ensure that they contain up-to-date industry skills.

New or revised program proposals should reflect what is needed in each local education system. Adjustments to the program descriptions and performance specifications can be made during the local validation process.

Performance specifications are available in two electronic formats: as WordPerfect documents and as V-TECS DIRECT data disks. To obtain copies of these disks in either or both of these formats, you may contact Doris Sharkey, Project Coordinator, Maryland State Department of Education, Division of Career Technology and Adult Learning, 200 West Baltimore Street, Baltimore, Maryland 21201, phone (410) 767-0185, fax (410)333-2099. This service is available to Maryland customers only.

Program Cluster: Health and Biosciences

ALLIED HEALTH

Program Title: Miscellaneous Allied Health Services, other **CIP #: 51.08, 51.16, 51.26**

Program Description:

This program prepares students to deliver health related services in a choice of health care settings, dependent on their senior specialty. The program provides a basic core of knowledge, skills, and attitudes common to direct patient care, diagnostic and therapeutic services. The senior course will include both clinical and classroom competencies. A geriatric nursing assistant certificate can be earned by meeting state requirements.

An integral part of the program completer's education is the participation in on-site observations of health professionals and planned clinical experiences in health service facilities. All clinical experiences for allied health are planned and supervised by the allied health staff who are credentialed or registered for their specialty of allied health.

NOTE: To meet state requirements for the geriatric nursing assistant component, clinical experiences are provided in a nursing home or extended care facility and are planned and supervised by a health occupations teacher who is a registered nurse. Content should include a focus on the special psychological, social and physical needs of the aging and licensing requirements for the geriatric nursing assistant.

Time Requirements

Planned, supervised clinical experiences of at least two hours for each hour of theory is recommended for this program. A minimum of 75 hours is required for the geriatric nursing assistant component which includes 37 1/2 hours of planned supervised nursing clinical experiences caring for geriatric patients in a nursing home or extended care facility.

Upon satisfactory completion of the geriatric nursing assistant component of the program the student is awarded a certificate of completion, which is issued by the school.

Skills Key:		
	A-I	Allied Health Core List (pages 1-4)
	DPC	Direct Patient Care Services (pages 4-6)
	DSP	Diagnostic Services Provider (pages 6-7)
	TCA	Therapeutic Care Aide/Fitness Services Technician (pages 8-10)

OCCUPATIONAL SKILLS

A COMMUNICATING WITH PATIENT/CLIENT AND OTHERS

A 001 Establish Rapport with Patient/Client
A 002 Take medical history
A 003 Listen empathetically to clients
A 004 Maintain patient/client confidentiality
A 005 Uphold patient/client rights
A 006 Orient patient/client/family to surroundings
A 007 Document patient/client data on chart and flow-sheet
A 008 Update plan of care
A 009 Teach/inform patient/client of rules/regulations/procedures and expectations
A 010 Report patient/client information to other health care providers

B CONDUCT PHYSICAL ASSESSMENT

B 001 Take vital signs
B 002 Obtain specimens
B 003 Obtain weight and height
B 004 Initiate response to change in patient's condition
B 005 Observe/document physiologic responses

C MAINTAIN PATIENT/CLIENT/PROVIDER SAFETY

C 001 Follow organizational policy/procedures and maintain universal precautions
C 002 Respond to code emergencies
C 003 Follow patient identification procedures
C 004 Provide for patient/client's physical safety
C 005 Secure hazardous substances/supplies
C 006 Maintain sterile/clean technique
C 007 Follow security procedures
C 008 Check safety and emergency equipment
C 009 Report unsafe conditions
C 010 Maintain safe/clean physical environment
C 011 Follow fire and disaster procedures
C 012 Employ appropriate body mechanics (load, lift and carry)
C 013 Complete incident report
C 014 Follow OSHA/MOSHA regulations
C 015 Enforce safety regulations

D PLAN PATIENT/CLIENT CARE

D 001 Determine comprehensive list of patient/client needs
D 002 Participate in interdisciplinary treatment plan
D 003 Assist patient/client & family in identifying resources strategies to meet goals
D 004 Revise patient/client treatment plan
D 005 Develop a patient/client discharge plan
D 006 Develop a patient/client teaching plan
D 007 Plan follow-up care

E PROVIDE PERSONAL PATIENT/CLIENT CARE

E 001 Assist patient/client with personal hygiene
E 002 Make bed/stretcher
E 003 Position patient/client
E 004 Ambulate patient/client
E 005 Transport patient/client
E 006 Assist patient/client with elimination needs
E 007 Dress/undress patient/client
E 008 Assist patient/client with eating
E 009 Provide patient/client physical comfort
E 010 Provide emotional support for client/patient/family

F IMPLEMENT BASIC PATIENT/CLIENT CARE PLAN

F 001 Change sterile and non-sterile dry dressing
F 002 Administer cold and heat treatments
F 003 Assist with procedures
F 004 Preform phlebotomy or venipuncture skills
F 005 Maintain natural and artificial airways
F 006 Manage mechanical ventilation
F 007 Maintain central access lines
F 008 Implement therapeutic exercises
F 009 Perform cast/splint care
F 010 Maintain traction/stabilization
F 011 Administer CPR
F 012 Provide wound and skin care
F 013 Control bleeding
F 014 Follow seizure precautions
F 015 Recognize/treat shock symptoms
F 016 Prevent aspirations

G ADMINISTER BASIC THERAPY/MEDICATION

G 001 Calculate dosage
G 002 Prepare medications
G 003 Administer IV therapy
G 004 Administer medications as ordered
G 005 Monitor patient/client response to medication

H MAINTAINING PROFESSIONAL GROWTH

H 001 Maintain professional behavior and demeanor
H 002 Maintain membership in national registry and professional organizations
H 003 Meet state licensing requirements
H 004 Attend conferences, in-service workshops, seminars, and multi-disciplinary meetings
H 005 Read professional journals
H 006 Attend instrument/equipment training and continuing education courses
H 007 Provide education for family/member workshops

I PERFORMING MANAGERIAL/CLERICAL FUNCTIONS

I 001 Schedule exams/special procedures
I 002 Perform receptionist duties (greet clients, process phone calls, duplicate materials)
I 003 Schedule transportation of patient
I 004 Enter data on computer
I 005 Record patient's history
I 006 Compile productivity data
I 007 Order supplies/equipment
I 008 Prepare forms/charts
I 009 Determine testing charge/coding
I 010 File patient's/client's records
I 011 Maintain equipment
I 012 Supervise volunteers
I 013 Verify equipment/supplies/medication inventory

(End of Allied Health Core List)

DIRECT PATIENT CARE SERVICES

DPC **A** **INTERVIEW PATIENT/CLIENT FAMILY**

DPC A 001 Assess immediate need

DPC **B** **CONDUCT PHYSICAL ASSESSMENT**

DPC B 001 Assess cardiovascular status
DPC B 002 Assess respiratory status
DPC B 003 Assess fluid balance status
DPC B 004 Assess neurological status
DPC B 005 Assess musculoskeletal status
DPC B 006 Assess integumentary status
DPC B 007 Assess genitourinary status
DPC B 008 Assess gastrointestinal status
DPC B 009 Assess obstetrical and gynecological status
DPC B 010 Assess psychosocial status

DPC **C** **MAINTAIN PATIENT/CLIENT/PROVIDER SAFETY**

DPC C 001 Set up isolation unit
DPC C 002 Make referrals for hazardous materials/emergency

DPC **D** **PLAN PATIENT/CLIENT CARE**

DPC D 001 Establish medical diagnoses
DPC D 002 Establish differential diagnoses
DPC D 003 Establish nursing diagnoses
DPC D 004 Prioritize realistic patient/client needs
DPC D 005 Assist patient/client in identifying long term/short term goals
DPC D 006 Evaluate individualized patient/client plan of care

DPC **E** **PROVIDE PERSONAL PATIENT/CLIENT CARE**

DPC E 001 Bathe patient

DPC **F** **IMPLEMENT PATIENT/CLIENT CARE PLAN**

DPC F 001 Apply bandages and binders
DPC F 002 Administer enemas
DPC F 003 Perform irrigations
DPC F 004 Maintain chest tube
DPC F 005 Remove sutures/staples
DPC F 006 Administer urinary catheter care
DPC F 007 Provide ostomy care
DPC F 008 Change/empty drainage devices

DPC **F** **IMPLEMENT PATIENT/CLIENT CARE PLAN** (Cont'd)

DPC F 009 Administer therapeutic medical gases
DPC F 010 Administer gavage feeding
DPC F 011 Administer NGT/GT care
DPC F 012 Immobilize fractures and dislocations
DPC F 013 Monitor nutritional status
DPC F 014 Monitor fluid intake and output
DPC F 015 Perform pulmonary toilet
DPC F 016 Provide postmortem care

DPC **G** **ADMINISTER MEDICATIONS/THERAPY**

DPC G 001 Administer oxygen therapy

DPC **H** **COMMUNICATE WITH OTHERS**

DPC H 001 Manage an accident/incident scene as 1st provider
DPC H 002 Document telephone and verbal orders
DPC H 003 Transcribe physician orders
DPC H 004 Verify current physician orders
DPC H 005 Make referrals
DPC H 006 Prepare change of shift report
DPC H 007 Follow chain of command
(End of Direct Patient Care Services list)

DIAGNOSTIC SERVICES PROVIDER

DSP **A** **PERFORMING PATIENT DIAGNOSTIC/THERAPEUTIC SERVICES**

DSP A 001 Triage patient requests
DSP A 002 Check patient's pre-test preparations
DSP A 003 Complete patient identification for labels/forms/specimens/films
DSP A 004 Prepare examination room for use
DSP A 005 Prepare therapeutic/diagnostic agents
DSP A 006 Administer therapeutic/diagnostic agents
DSP A 007 Adjust control parameters for individual patient requirements
DSP A 008 Perform therapeutic procedures
DSP A 009 Perform testing
DSP A 010 Record images
DSP A 011 Process exposed film
DSP A 012 Critique diagnostic test/study
DSP A 013 Prepare specimens for transfer
DSP A 014 Process specimens
DSP A 015 Process computerized test data
DSP A 016 Evaluate test results

DSP **A** PERFORMING PATIENT DIAGNOSTIC/THERAPEUTIC SERVICES (Cont'd)

DSP A 017 Verify test results.
DSP A 018 Record test results.
DSP A 019 Store pharmaceutical/non-drug/radioactive supplies and materials
DSP A 020 Store specimens
DSP A 021 Prepare preliminary report
DSP A 022 Display test results/films for doctor's interpretation/verification

DSP **B** OPERATING EQUIPMENT

DSP B 001 Perform equipment test/calibration check
DSP B 002 Prepare reference standard
DSP B 003 Perform daily equipment quality control protocols/checks
DSP B 004 Monitor equipment function
DSP B 005 Prepare equipment maintenance/repair requests
DSP B 006 Decontaminate equipment

DSP **C** MAINTAIN PATIENT/STAFF SAFETY

DSP C 001 Perform work area safety survey
DSP C 002 Follow quality assurance criteria
DSP C 003 Comply with radiation safety standards
DSP C 004 Monitor staff/self exposure to radiation
DSP C 005 Post warning signs on patient bed/room/danger zones
DSP C 006 Verify physicians orders
DSP C 007 Monitor therapeutic/diagnostic equipment during patient procedure
DSP C 008 Decontaminate work area
DSP C 009 Dispose of waste
DSP C 010 Dispose of contaminated materials
DSP C 011 Transport specimens/materials/supplies

DSP **D** COMMUNICATE WITH OTHER HEALTH CARE PROVIDERS

DSP D 001 Inform nursing staff of triage results
DSP D 002 Report critical patient information to other health care providers
DSP D 003 Assist with interdepartmental testing procedures

DSP **E** PERFORM CLERICAL FUNCTIONS

DSP E 001 Maintain daily log of patient/procedures performance
DSP E 002 Record license compliance regulations data
DSP E 003 Process patient test report
DSP E 004 Distribute test results
DSP E 005 Store test results and files/cassettes
DSP E 006 Retrieve test results
DSP E 007 Duplicate films

(End of Diagnostic Services Provider List)

THERAPEUTIC CARE AIDE / FITNESS SERVICES TECHNICIAN

TCA **A** MAINTAIN CLIENT SAFETY

TCA A 001 Maintain awareness of patient limitations
TCA A 002 Perform spotting techniques
TCA A 003 Provide feedback to client on proper technique*
TCA A 004 Provide in-service training on equipment and procedures*

TCA **B** COMMUNICATING WITH OTHERS

TCA B 001 Provide feedback to supervising therapist on client behavior/progress
TCA B 002 Use discretion when communicating with clients
TCA B 003 Maintain a sensitivity to clients situations and conditions
TCA B 004 Provide feedback to clients
TCA B 005 Resolve conflicts with clients and among co-workers*
TCA B 006 Follow-up with patient/family/care provider*
TCA B 007 Participate in community activities

TCA **C** PERFORM NON-PATIENT RELATED TASKS

TCA C 001 Follow check list for preparation of activities/equipment/facilities
TCA C 002 Adjust DME equipment*
TCA C 003 Clean and sanitize treatment area

TCA **D** IMPLEMENT/MAINTAIN FITNESS/THERAPEUTIC PLANS

TCA D 001 Set-up for client treatment
TCA D 002 Explain the program and rationale*
TCA D 003 Assist with client transfers
TCA D 004 Demonstrate use of fitness equipment and mechanics
TCA D 005 Assist client with exercise treatment (strengthening, stretching, sitting, standing)
TCA D 006 Complete fabrication of equipment
TCA D 007 Monitor individual performance
TCA D 008 Screen client for appropriateness of treatment*
TCA D 009 Assist with preparation of initial treatment plans*
TCA D 010 Demonstrate use of therapeutic equipment*
TCA D 011 Instruct client/patient in gait training techniques*
TCA D 012 Demonstrate breathing techniques*
TCA D 013 Administer therapeutic modalities*
TCA D 014 Give client therapeutic massage*
TCA D 015 Train client in ADL's*

TCA **D** **IMPLEMENT/MAINTAIN FITNESS/THERAPEUTIC PLANS** (Cont'd)

TCA D 016 Fabricate cast and splints*
TCA D 017 Conduct therapeutic sessions*
TCA D 018 Design adaptive equipment*
TCA D 019 Train client in use of adaptive equipment*
TCA D 020 Monitor client progress*

TCA **E** **PROVIDING PERSONAL CLIENT CARE BEFORE/DURING TREATMENT**

TCA E 001 Assist clients with-in donning doffing prosthetics/orthotics

*Advanced skills identified by members of the I/EAG Advisory Committee.

TCA **F** **PROVIDE DISCHARGE PLANNING**

TCA F 001 Review the home exercise program*
TCA F 002 Adjust assistive devices*

TCA **G** **PERFORM ASSESSMENTS**

TCA G 001 Interview client*
TCA G 002 Evaluate health history*
TCA G 003 Evaluate exercise history*
TCA G 004 Determine target heart rate*
TCA G 005 Evaluate body composition*
TCA G 006 Take girth measurements*
TCA G 007 Measure flexibility*
TCA G 008 Measure muscular endurance*
TCA G 009 Measure muscular strength*
TCA G 010 Measure vital capacity*
TCA G 011 Measure range of motion*
TCA G 012 Evaluate cardiovascular capacity*

TCA **H** **DESIGN/IMPLEMENT INDIVIDUAL FITNESS PROGRAMS**

TCA H 001 Interpret fitness assessment data*
TCA H 002 Interpret exercise prescriptions*
TCA H 003 Consult with manager/supervisor*
TCA H 004 Create an individualized program*

TCA I PROVIDE ATHLETIC TRAINING SERVICES

TCA I 001 Wrap injured areas*
TCA I 002 Perform prophylactic taping*
TCA I 003 Apply protective padding*
TCA I 004 Apply prefabricated braces*
TCA I 005 Assist in fitting protective devices*
TCA I 006 Perform initial screening for severity of injury*
TCA I 007 Check for safe environmental conditions*

*Advanced skills identified by members of the I/EAG Advisory Committee.

(End of Therapeutic Care Aide / Fitness Services Technician list)

FOUNDATION SKILLS

J LANGUAGE ARTS

J 001 Adapts diction/structure audience, purpose, situation
J 002 Adapts strategy listening, reading, speaking, writing
J 003 Adapts style, audience, cultural differences, purpose
J 004 Attends directions/task
J 005 Attends nonverbal cues
J 006 Attends verbal cues
J 007 Collects/organizes information-oral/written classifications, discussions
J 008 Composes/edits audio-visual aids graphs
J 009 Composes/edits notes lecture
J 010 Composes/edits reports/essays evaluations/critiques, expositions
J 011 Composes/edits reports/essays information supplying
J 012 Composes/edits reports/essays narratives, summaries
J 013 Composes/edits sentences punctuation
J 014 Composes/edits social communications/letters business
J 015 Comprehends information-oral cause/effect relationships, context, main idea
J 016 Comprehends information-oral purpose
J 017 Comprehends information-written charts/tables/graphs, conclusions, main idea
J 018 Comprehends information-written rationale, sequence, setting, summaries
J 019 Evaluates information-oral adequacy/sufficiency, fact/opinion, relevant/irrelevant
J 020 Evaluates information-oral sources, validity
J 021 Evaluates information-written adequacy/sufficiency, fact/opinion
J 022 Evaluates information-written relationship of ideas, relevant/irrelevant
J 023 Evaluates information-written sources
J 024 Identifies function of words
J 025 Identifies information-written abbreviations, euphemisms, explicit/implicit
J 026 Identifies information-written irony/satire
J 027 Identifies purpose/strategy listening, speaking, writing
J 028 Infers/predicts information-oral assumptions/biases, cause/effect relationships
J 029 Infers/predicts information-oral character traits, oral purpose
J 030 Infers/predicts information-written assumptions/biases, cause/effect relationships

J LANGUAGE ARTS (Cont'd)

J 031 Infers/predicts information-written character traits, outcomes/solutions
J 032 Infers/predicts information-written purpose, rationale
J 033 Presents informal speech discussion, information requests
J 034 Presents informal speech information supplying, interpretation, interview, persuasive

K MATHEMATICS

K 001 Calculates/evaluates factors whole numbers/divisibility
K 002 Calculates/evaluates geometric figures area, circumference
K 003 Calculates/evaluates linear relationship ordered pairs
K 004 Calculates/evaluates measurement precision
K 005 Calculates/evaluates percent in/decrease* markup/discount
K 006 Calculates/evaluates prime factors, unit measure price
K 007 Computes addition decimals, fractions, mentally, mixed numbers, whole numbers
K 008 Computes division binomials, decimals, whole numbers
K 009 Computes expected values
K 010 Computes multiplication decimals, fractions, mixed numbers, whole numbers
K 011 Computes polynomial functions, table of values
K 012 Computes rational expressions, slope of line intercept form
K 013 Computes square vertex
K 014 Computes subtraction binomials, complex numbers, decimals, fractions, mentally
K 015 Computes subtraction whole numbers
K 016 Constructs charts/tables/graphs data points
K 017 Constructs geometric figures compass/straight edge
K 018 Constructs lines congruent segments
K 019 Converts decimals/fractions ratios/percents
K 020 Distinguishes angles/circles/arcs, equal/not equal
K 021 Distinguishes estimate/exact value
K 022 Estimates/rounds geometric figures area
K 023 Estimates/rounds numbers add/subtract/divide/multiply
K 024 Identifies English measures length/volume/weight
K 025 Identifies geometric figure circles/angles/arcs/polygons
K 026 Identifies graphs of function
K 027 Identifies lines parallel/perpendicular
K 028 Identifies metric measures length/volume/weight
K 029 Identifies missing/irrelevant data word problems
K 030 Interprets charts/tables/graphs
K 031 Interprets symbols <* >* =* e.g.
K 032 Interprets system of numbers place value
K 033 Measures direct distance, temperature, time, volume, weight
K 034 Measures metric temperature, volume, weight
K 035 Solves problems coordinate geometry equation of a line
K 036 Solves problems fractions/decimals/ratios/percents
K 037 Solves problems fractions/decimals/ratios/percents direct/indirect variation
K 038 Solves problems proportion area, volume, weight

K MATHEMATICS (Cont'd)

K 039 Solves problems rational expressions
K 040 Understands definitions
K 041 Understands geometric figures visual perception
K 042 Understands order of operations rules

L SCIENCE

L 001 Analyzes/evaluates environmental issues waste management, pollution
L 002 Applies/uses laboratory techniques safety
L 003 Applies/uses scientific methods analysis--qualitative/quantitative, data gathering
L 004 Applies/uses scientific methods observation--direct/indirect
L 005 Converts measurement units
L 006 Describes/explains atoms chemical formulas, atoms structure
L 007 Describes/explains biochemistry ATP/ADP
L 008 Describes/explains biochemistry body heat, cell respiration, cellulose, chlorophyll
L 009 Describes/explains biochemistry fermentation, food energy pyramid
L 010 Describes/explains biochemistry phosphate groups
L 011 Describes/explains biochemistry photosynthesis, protein synthesis
L 012 Describes/explains biochemistry simple sugar
L 013 Describes/explains carbon/organic chemistry, amino acids, carbohydrates,
L 014 Describes/explains carbon/organic chemistry compounds, cyclichydrocarbons
L 015 Describes/explains carbon/organic chemistry fats, glucose
L 016 Describes/explains carbon/organic chemistry hydrocarbons--derivatives
L 017 Describes/explains carbon/organic chemistry hydrocarbons--saturated/unsaturated
L 018 Describes/explains carbon/organic chemistry isomers, lipids, polyatomicion
L 019 Describes/explains carbon/organic chemistry proteins, tetrahedron
L 020 Describes/explains carbon/organic chemistry vitamins
L 021 Describes/explains cells, diffusion, division, eukaryote, homeostasis, osmosis
L 022 Describes/explains cells parts/functions
L 023 Describes/explains cells photosynthesis/ATP
L 024 Describes/explains cells prokaryote, respiration
L 025 Describes/explains cells transport--active/passive
L 026 Describes/explains human/animal aging
L 027 Describes/explains human/animal blood cells/platelets, blood pressure
L 028 Describes/explains human/animal cardiovascular system, circulatory system
L 029 Describes/explains human/animal development, digestive system, diseases
L 030 Describes/explains human/animal endocrine system, excretory system, hemoglobin
L 031 Describes/explains human/animal homeostasis, hormones, immune system
L 032 Describes/explains human/animal maintenance/management, metabolism
L 033 Describes/explains human/animal muscular system, nervous system
L 034 Describes/explains human/animal organs/transplants, plasma, reproductive system

L SCIENCE (Cont'd)

L 035 Describes/explains human/animal respiratory system, skeletal system, skin, tissues
L 036 Describes/explains human/animal weight gain/loss
L 037 Describes/explains solutions soluble/insoluble
L 038 Describes/explains work levers, pulleys
L 039 Identifies organisms bacteria
L 040 Measures distance/length, mass/weight, pressure, temperature F/C
L 041 Measures mass/weight
L 042 Measures pressure, temperature F/C, time, volume liquids/solids.
L 043 Uses computers information processing

WORKPLACE SKILLS

The Workplace Skills listed below were developed by Illinois and validated in 25 states, including Maryland, for V-TECS (Vocational-Technical Education Consortium of States).

The MSDE Industry/Education Advisory Group determined that all of the skills listed were important for Allied Health employees.

M DEVELOP AN EMPLOYMENT PLAN

M 001 Match interests to employment area
M 002 Match aptitudes to employment area
M 003 Identify short term work goals
M 004 Match attitudes to job area
M 005 Match personality type to job area
M 006 Match physical capabilities to job area
M 007 Identify career information from counseling sources
M 008 Demonstrate a drug-free status

N SEEK AND APPLY FOR EMPLOYMENT OPPORTUNITIES

N 001 Locate employment opportunities
N 002 Identify job requirements
N 003 Locate resources for finding employment
N 004 Prepare a resume
N 005 Prepare for job interview
N 006 Identify conditions for employment
N 007 Evaluate job opportunities
N 008 Identify steps in applying for a job
N 009 Write job application letter
N 010 Write interview follow-up letter
N 011 Complete job application form
N 012 Identify attire for job interview

O ACCEPT EMPLOYMENT

O 001 Apply for social security number
O 002 Complete state and federal tax forms
O 003 Accept or reject employment offer
O 004 Complete Employee's Withholding Allowance Certificate Form W-4

P COMMUNICATE ON THE JOB

P 001 Communicate orally with others
P 002 Use telephone etiquette
P 003 Interpret the use of body language
P 004 Prepare written communication
P 005 Follow written directions
P 006 Ask questions about task

Q INTERPRET THE ECONOMICS OF WORK

Q 001 Identify the role of business in the economic system
Q 002 Describe responsibilities of employee
Q 003 Describe responsibilities of employer or management
Q 004 Investigate opportunities and options for business ownership
Q 005 Assess entrepreneurship skills

R MAINTAIN PROFESSIONALISM

R 001 Participate in employment orientation
R 002 Assess business image, products and/or services
R 003 Identify and model positive behavior **
R 004 Identify company dress and appearance standards
R 005 Participate in meetings
R 006 Identify work-related terminology
R 007 Identify how to treat people with respect
R 008 Exhibit appropriate conduct before clients/customers **

S ADAPT AND COPE WITH CHANGE

S 001 Identify elements of job transition
S 002 Formulate transition plan
S 003 Identify implementation procedures for a transition plan
S 004 Evaluate the transition plan
S 005 Exhibit ability to handle stress
S 006 Recognize need to change or quit a job
S 007 Write a letter of resignation

T SOLVING PROBLEMS AND CRITICAL THINKING

T 001 Identify the problem
T 002 Clarify purposes and goals
T 003 Identify solutions to a problem and their impact
T 004 Employ reasoning skills
T 005 Evaluate options
T 006 Set priorities
T 007 Select and implement a solution to a problem
T 008 Evaluate results of implemented option
T 009 Organize workloads
T 010 Assess employer and employee responsibility in solving a problem

U MAINTAIN SAFE AND HEALTHY WORK ENVIRONMENT

U 001 Identify safety and health rules/procedures
U 002 Demonstrate the knowledge of equipment in the work place
U 003 Identify conservation and environmental practices and policies
U 004 Respond to emergencies
U 005 Maintain safe work area
U 006 Identify hazardous substances in the work place

V DEMONSTRATE WORK ETHICS AND BEHAVIOR

V 001 Apply established rules, regulations and policies
V 002 Practice cost effectiveness
V 003 Practice time management
V 004 Assume responsibility for decisions and actions
V 005 Exhibit pride
V 006 Display initiative
V 007 Display assertiveness
V 008 Demonstrate a willingness to learn
V 009 Identify the value of maintaining regular attendance
V 010 Apply ethical reasoning

W DEMONSTRATE TECHNOLOGICAL LITERACY

W 001 Demonstrate basic keyboarding skills
W 002 Demonstrate basic knowledge of computing
W 003 Recognize impact of technological changes on tasks and people

X MAINTAIN INTERPERSONAL RELATIONSHIPS

X 001 Value individual diversity
X 002 Respond to praise or criticism
X 003 Provide constructive praise or criticism
X 004 Channel and control emotional reactions
X 005 Resolve conflicts
X 006 Display a positive attitude
X 007 Identify and react to sexual intimidation/harassment

Y DEMONSTRATE TEAM WORK

Y 001 Identify style of leadership used in team work
Y 002 Match team member skills and group activity
Y 003 Work with team members
Y 004 Complete a team task
Y 005 Evaluate outcomes

** Underlined words were added to the V-TECS Generic Workplace Skills list by the MSDE Industrial/Educational Advisory Group.

Primary Occupations Addressed by this Program

EKG Assistant
Fitness Instructor Assistant
Health Club Assistant
Medical Assistant
Medical Laboratory Assistant
Nursing Assistant and Geriatric Nursing Assistant
Occupational Therapy Aide
Physical Therapy Aide
Radiology Aide
Sports Medicine Aide

Facilities

The facilities, equipment, and supplies used in this program are representative of the current technology and applications of business and industry.

Program Cluster: Health and Biosciences

BIOTECHNOLOGY LABORATORY TECHNICIAN

Program Title: Medical Laboratory Assistant CIP# : 51.08

Program Description:

The Medical Laboratory Assistant program prepares students to perform a variety of laboratory procedures under close supervision according to site-specific protocols.

Principles of biotechnology and practices/procedures are taught within the context of preparation for entrance into the world of work and/or a two-year associate of arts program for Biotechnician/Laboratory Technician. Program completers are prepared to perform technical assignments using biological and chemical processes that relate to scientific studies, assays and quality assurance.

OCCUPATIONAL SKILLS

A PERFORM TESTS/ASSAYS

A 001 Obtain and read and comprehend protocol, test procedure, SOP
A 002 Prepare sample for testing
A 003 Check equipment
A 004 Determine acceptability and optimum conditions of reagents for tests
A 005 Assess acceptability/appropriateness of specimen
A 006 Perform tests/assays: chemical, biological, clinical, environmental, robotics, mechanical
A 007 Perform aseptic techniques where needed
A 008 Return, archive, or dispose of samples

B MANUFACTURE PRODUCTS

B 001 Follow SOP and batch record (protocol or procedure)
B 002 Obtain raw material
B 003 Set up equipment according to process requirements
B 004 Perform cleaning (manual/CIP) and sterilize (autoclave/SIP)
B 005 Prepare buffers and solutions
B 006 Start up production
B 007 Operate bio-reactors and recover product
B 008 Obtain, process, and store product samples (applies to all manufacturing steps)
B 009 Purify biological material
B 010 Formulate, fill, and inspect product

C OBTAIN SPECIMENS OR MATERIALS

C 001 Match request to test sample
C 002 Prepare animals
C 003 Obtain and label sample/specimen
C 004 Handle, transport, store sample, including regulatory requirements
C 005 Assess acceptability/appropriateness of specimen

D PROCESS MATERIALS

D 001 Organize compounds
D 002 Prepare buffers, reagents
D 003 Set up and run reactions

E CONTROL INVENTORY

E 001 Monitor and record inventory and/or keep census of animals
E 002 Order supplies, reagents, animals
E 003 Date, label, store supplies and/or reagents; identify animals
E 004 Verify incoming delivery accuracy
E 005 Check expiration dates and lot numbers
E 006 Maintain separate in-process, quarantine, and release areas
E 007 Maintain and store manufactured products inventory

F MAINTAIN EQUIPMENT AND FACILITY

F 001 Check calibration and perform system diagnostics
F 002 Validate or confirm processes, equipment, facilities, kits, vendor products
F 003 Perform or schedule preventive maintenance
F 004 Clean work area according to SOPs
F 005 Sample environment
F 006 Implement systems updates
F 007 Maintain equipment logs
F 008 Troubleshoot and repair equipment (work order)
F 009 Label equipment
F 010 Ensure clean room integrity

G OBSERVE AND DOCUMENT SAFE PRACTICES

G 001 Maintain and follow chemical hygiene plan
G 002 Follow universal precautions for biological pathogens
G 003 Use protective equipment
G 004 Observe rules of safety with radioactive materials

G OBSERVE AND DOCUMENT SAFE PRACTICES (Cont'd)

G 005 Observe rules of electrical safety
G 006 Attend required training
G 007 Handle, contain, and dispose of hazardous materials
G 008 Maintain safety equipment
G 009 Observe procedures for the safe use of instruments and cylinders

H COMPLY WITH CURRENT ACCREDITATION AND GOVERNMENT REGULATIONS

H 001 Follow regulations: FDA (GMPs and GLPs)
H 002 Follow regulations: OSHA
H 003 Follow regulations: USDA
H 004 Follow regulations: NIH
H 005 Follow regulations: CDC
H 006 Follow regulations: CLIA
H 007 Follow regulations: NRC
H 008 Follow state and local regulations
H 009 Follow industry and professional regulations

I MAINTAIN QUALITY ASSURANCE

I 001 Inspect, release incoming inventory
I 002 Check, verify integrity of the product, procedure, specimen
I 003 Use test standards, controls
I 004 Maintain laboratory records and documentation
I 005 Follow policies and procedures
I 006 Monitor work-in-process
I 007 Take and document corrective action according to SOP or as directed
I 008 Participate in proficiency testing
I 009 Ensure timely turnaround time

J EVALUATE, DOCUMENT, AND REPORT RESULTS

J 001 Collect data
J 002 Perform calculations
J 003 Perform basic statistical analysis
J 004 Evaluate validity of results
J 005 Identify abnormal results
J 006 Document and compile test results
J 007 Obtain written or verbal verification

K COMMUNICATE AND DOCUMENT Information (Written, Oral, Electronic)

K 001 Interact with vendors, colleagues, and clients
K 002 Coordinate tasks with coworkers
K 003 Draft or update procedure manuals and reports for validation
K 004 Write memos and letters
K 005 Make oral presentations
K 006 Process information using computers
K 007 Notify appropriate persons about problems and observations
K 008 Document communication of information

L PERFORM INITIAL RESEARCH

L 001 Research literature
L 002 Maintain laboratory notebook

M MAINTAIN PROFESSIONAL COMPETENCY

M 001 Participate in training and cross-training
M 002 Maintain awareness of accreditation and government regulations
M 003 Participate in continuing education and professional organizations
M 004 Pursue additional certification and degrees
M 005 Read technical literature
M 006 Document training
M 007 Maintain professional demeanor

The above skills were adapted from the Bioscience Industry Skills Standards Project, 1995, Education Development Center, Inc.

FOUNDATION SKILLS

N LANGUAGE ARTS

N 001 Adapts diction/structure audience, purpose, situation
N 002 Adapts strategy speaking, writing
N 003 Adapts style audience, cultural differences, purpose
N 004 Attends directions/task
N 005 Attends nonverbal cues, verbal
N 006 Collects/organizes information-oral/written classifications, discussions,
N 007 Collects/organizes information--oral/written library resources, notes, observations
N 008 Collects/organizes information--oral/written personal experiences
N 009 Collects/organizes information-oral/written reading
N 010 Composes/edits audio-visual aids graphs, outlines
N 011 Composes/edits paragraphs cause/effect relationships

N LANGUAGE ARTS (Cont'd)

N 012 Composes/edits reports/essays evaluations/critiques
N 013 Composes/edits reports/essays information supplying, narratives, summaries
N 014 Composes/edits social communications/letters business
N 015 Comprehends information-oral assumptions/biases, cause/effect relationships
N 016 Comprehends information-oral comparisons/contrasts, conclusions, context,
N 017 Comprehends information-oral purpose, rationale
N 018 Comprehends information-written assumptions/biases, charts/tables/graphs
N 019 Comprehends information-written conclusions, main idea, rationale, sequence
N 020 Evaluates information-oral adequacy/sufficiency, fact/opinion, reality/fantasy
N 021 Evaluates information-oral relevant/irrelevant, sources, validity
N 022 Evaluates information-written adequacy/sufficiency, appropriateness, clarity
N 023 Evaluates information-written conclusions/solutions, fact, opinion,
N 024 Evaluates information-written relationship of ideas, relevant/irrelevant
N 025 Evaluates information-written sources, abbreviations
N 026 Identifies purpose/strategy writing
N 027 Infers/predicts information-oral assumptions/biases, cause/effect relationships
N 028 Infers/predicts information-oral character traits, outcomes/solutions
N 029 Infers/predicts information-oral purpose, rationale
N 030 Infers/predicts information-written assumptions/biases, cause/effect relationships
N 031 Infers/predicts information-written character traits, main idea, outcomes/solution
N 032 Infers/predicts information-written purpose, rationale
N 033 Presents informal speech discussion, information requests, information supplying
N 034 Presents informal speech interpretation, interview, persuasive

O MATHEMATICS

O 001 Calculates/evaluates measurement precision
O 002 Calculates/evaluates percent in/decrease/ markup/discount
O 003 Calculates/evaluates unit measure price
O 004 Converts decimals/fractions ratios/percents
O 005 Identifies English measures length/volume/weight
O 006 Identifies graphs of function
O 007 Identifies metric measures length/volume/weight
O 008 Identifies missing/irrelevant data word problems
O 009 Interprets charts/tables/graphs
O 010 Interprets charts/tables/graphs functions
O 011 Interprets symbols <* >* =* e.g.
O 012 Interprets system of numbers place value
O 013 Interprets system of numbers rational numbers* e.g. fractions
O 014 Measures direct distance
O 015 Measures direct temperature
O 016 Measures direct time, volume, weight
O 017 Measures indirect
O 018 Measures metric temperature, volume, weight

O MATHEMATICS (Cont'd)

O 019 Solves problems fractions/decimals/ratios/percents, direct/indirect variation
O 020 Solves problems proportion area, volume, weight, rational expressions
O 021 Understands definitions
O 022 Understands order of operations rules
O 023 Uses calculator addition, division, formulas, multiplication, subtraction

P SCIENCE

P 001 Analyzes/evaluates environmental issues, waste management
P 002 Analyzes/evaluates experiments questions
P 003 Applies/uses laboratory instruments, laboratory techniques safety
P 004 Applies/uses maps/charts/tables/graphs
P 005 Applies/uses scientific methods analysis--qualitative/quantitative
P 006 Applies/uses scientific methods data gathering
P 007 Applies/uses scientific methods observation--direct/indirect
P 008 Applies/uses scientific methods predictions
P 009 Reports measurement units
P 010 Describes/explains environmental issues ecology
P 011 Describes/explains chemical reactions catalysts
P 012 Describes/explains heat temperature, organisms adaptation
P 013 Describes/explains solutions soluble/insoluble
P 014 Identifies acids/bases
P 015 Identifies organisms bacteria
P 016 Identifies organisms fungi
P 017 Identifies organisms insects
P 018 Identifies organisms plants
P 019 Measures mass/weight
P 020 Measures pressure
P 021 Measures temperature Fahrenheit/Celsius
P 022 Measures volume liquids/solids
P 023 Uses computers information processing

WORKPLACE SKILLS

The Workplace Skills listed below were developed by Illinois and validated in 25 states including Maryland for V-TECS (Vocational-Technical Education Consortium of States).

* The MSDE Industry/Education Advisory Group determined these workplace skills were most important for the Biotechnology Laboratory Technician.

Q DEVELOP AN EMPLOYMENT PLAN

Q 001 Match interests to employment area *
Q 002 Match aptitudes to employment area *
Q 003 Identify short term work goals *
Q 004 Match attitudes to job area *
Q 005 Match personality type to job area *
Q 006 Match physical capabilities to job area *
Q 007 Identify career information from counseling sources *
Q 008 Demonstrate a drug-free status *

R SEEK AND APPLY FOR EMPLOYMENT OPPORTUNITIES

R 001 Locate employment opportunities *
R 002 Identify job requirements *
R 003 Locate resources for finding employment *
R 004 Prepare a resume *
R 005 Prepare for job interview *
R 006 Identify conditions for employment *
R 007 Evaluate job opportunities. *
R 008 Identify steps in applying for a job *
R 009 Write job application letter *
R 010 Write interview follow-up letter *
R 011 Complete job application form *
R 012 Identify attire for job interview *

S ACCEPT EMPLOYMENT

S 001 Apply for social security number *
S 002 Complete state and federal tax forms *
S 003 Accept or reject employment offer *
S 004 Complete Employee's Withholding Allowance Certificate Form W-4 *

T COMMUNICATE ON THE JOB

T 001 Communicate orally with others *
T 002 Use telephone etiquette *
T 003 Interpret the use of body language *
T 004 Prepare written communication *
T 005 Follow written directions *
T 006 Ask questions about task *

U INTERPRET THE ECONOMICS OF WORK

U 001 Identify the role of business in the economic system
U 002 Describe responsibilities of employee *
U 003 Describe responsibilities of employer or management *
U 004 Investigate opportunities and options for business ownership
U 005 Assess entrepreneurship skills

V MAINTAIN PROFESSIONALISM

V 001 Participate in employment orientation *
V 002 Assess business image, products and/or services *
V 003 Identify positive behavior *
V 004 Identify company dress and appearance standards *
V 005 Participate in meetings *
V 006 Identify work-related terminology *
V 007 Identify how to treat people with respect *

W ADAPT AND COPE WITH CHANGE

W 001 Identify elements of job transition
W 002 Formulate transition plan
W 003 Identify implementation procedures for a transition plan
W 004 Evaluate the transition plan
W 005 Exhibit ability to handle stress *
W 006 Recognize need to change or quit a job *
W 007 Write a letter of resignation *

X SOLVE PROBLEMS AND THINK CRITICALLY

X 001 Identify the problem *
X 002 Clarify purposes and goal *
X 003 Identify solutions to a problem and their impact *
X 004 Employ reasoning skills *
X 005 Evaluate options *
X 006 Set priorities *
X 007 Select and implement a solution to a problem *
X 008 Evaluate results of implemented option *
X 009 Organize workloads *
X 010 Assess employer and employee responsibility in solving a problem *

Y MAINTAIN SAFE AND HEALTHY WORK ENVIRONMENT

Y 001 Identify safety and health rules/procedures *
Y 002 Demonstrate the knowledge of equipment in the work place *
Y 003 Identify conservation and environmental practices and policies *
Y 004 Act during emergencies *
Y 005 Maintain work area *
Y 006 Identify hazardous substances in the work place *

Z DEMONSTRATE WORK ETHICS AND BEHAVIOR

Z 001 Identify established rules, regulations and policies *
Z 002 Practice cost effectiveness *
Z 003 Practice time management *
Z 004 Assume responsibility for decisions and actions *
Z 005 Exhibit pride *
Z 006 Display initiative *
Z 007 Display assertiveness *
Z 008 Demonstrate a willingness to learn *
Z 009 Identify the value of maintaining regular attendance *
Z 010 Apply ethical reasoning *

AA DEMONSTRATE TECHNOLOGICAL LITERACY

AA 001 Demonstrate basic keyboarding skills *
AA 002 Demonstrate basic knowledge of computing *
AA 003 Recognize impact of technological changes on tasks and people *

BB MAINTAIN INTERPERSONAL RELATIONSHIPS

BB 001 Value individual diversity *
BB 002 Respond to praise or criticism *
BB 003 Provide constructive praise or criticism *
BB 004 Channel and control emotional reactions *
BB 005 Resolve conflicts *
BB 006 Display a positive attitude *
BB 007 Identify and react to sexual intimidation/harassment *

CC DEMONSTRATE TEAM WORK

CC 001 Identify style of leadership used in team work *
CC 002 Match team member skills and group activity *
CC 003 Work with team members *
CC 004 Complete a team task *
CC 005 Evaluate outcomes *

Primary Occupations Addressed by this Program

Research Laboratory Assistant

Medical Laboratory Assistant

Facilities, Equipment and Supplies

The facilities, equipment, and supplies used in the Medical Laboratory Assistant program are representative of the current technology and applications of the biotechnology industry.

Program Cluster: Manufacturing, Engineering, and Technology

COMPUTER AIDED DRAFTING and DESIGN

Program Title: Drafting **CIP#: 48.01**

Program Description:

This instructional program prepares individuals to plan, prepare, and interpret mechanical, architectural, structural, pneumatic, electric/electronic, topographical, and other drawings; to use reproduction materials, equipment, and processes, to develop, plan, and process charts and drawings; to develop models; and to prepare reports and data sheets for writing specification sheets.

OCCUPATIONAL SKILLS

A FUNDAMENTAL DRAFTING SKILLS - DRAFTING SKILLS

A 001 Use drawing media and related drafting materials (eg. papers,vellum,mylar,plotter)
A 002 Use basic measurement systems (eg. fractions, decimals, metric measurements)
A 003 Add correct annotation to drawing
A 004 Identify line styles and weights
A 005 Prepare title blocks and other drafting formats
A 006 Apply metric and/or dual dimensioning standards
A 007 Identify and use appropriate standard symbols
A 008 Reproduction of originals using different methods (eg. photocopy, plot, blueprint)
A 009 Create freehand technical sketches

B FUNDAMENTAL DRAFTING SKILLS - ORTHOGRAPHIC PROJECTIONS

B 001 Identify, create, and place appropriate orthographic views
B 002 Identify, create, and place appropriate auxiliary views
B 003 Identify, create, and place appropriate section views

C FUNDAMENTAL DRAFTING SKILLS - PICTORIAL DRAWINGS

C 001 Identify, create, axonometric drawings (eg. isometric)
C 002 Identify, create, and create oblique drawings (eg. cabinet, cavalier)
C 003 Identify, perspective drawings (eg. 1-point, 2-point, 3-point)

D FUNDAMENTAL DRAFTING SKILLS - DIMENSIONING

D 001 Apply dimensioning rules (eg. avoid redundant dim., avoid dim. to hidden lines)
D 002 Use correct dimension line terminators (eg. arrowheads, ticks, slashes)
D 003 Dimension objects (eg. lines arcs, angles, circular)
D 004 Dimension complex shapes (eg. spheres, cylinders, tapers, pyramids)
D 005 Dimension features from a center line
D 006 Dimension a theoretical point of intersection
D 007 Use appropriate dual dimensioning standards
D 008 Use size and location dimension practices
D 009 Use various dimensioning styles (eg. Cartesian, polar, ordinate, datum)
D 010 Place tolerance dimensioning and Geometric Dimensioning and Tolerancing (GD&T) on drawing

E COMPUTER SKILLS - HARDWARE

E 001 Demonstrate proper care of equipment
E 002 Operate and adjust input devices (eg. mouse, keyboard, digitizer, scanner)
E 003 Operate and adjust output devices (eg. printers, plotters)
E 004 Correct handling and operation of storage media
E 005 Start and shut down work station
E 006 Adjust monitor controls for maximum comfort and usability
E 007 Recognize availability of information services (eg. e-mail, bulletin boards)

F COMPUTER SKILLS - PHYSICAL AND SAFETY NEEDS

F 001 Explain ergonomic considerations (eg. keyboard & screen position, lighting)
F 002 Demonstrate personal safety (eg. electrical and mechanical hazards)

G COMPUTER SKILLS - OPERATING SYSTEMS

G 001 Start and exit and software system as required
G 002 Demonstrate proper file management techniques (eg. copying, deleting, security, anti-virus)
G 003 Format a floppy disk
G 004 Identify, create, and use directory structure and change directory paths
G 005 Demonstrate proper file maintenance and backup procedures
G 006 Translate, import, and export data files between formats (eg. IGES, DXF)
G 007 Use on-line help
G 008 Identify procedures for saving drawings to storage devices

H BASIC CADD SKILLS - CREATE

H 001 Create a new drawing
H 002 perform drawing set up
H 003 Construct geometric figures (eg. lines, splines, circles, and arcs)
H 004 Create text using appropriate styles and size to annotate drawings
H 005 Use and control accuracy enhancement tools (eg. snap and XYZ entity positioning methods)
H 006 Identify, create, store, and use appropriate symbols/libraries
H 007 Create wireframe/solid models
H 008 Create objects using primitives
H 009 Create 2-D geometry from 3-D models
H 010 Revolve a profile to create a 3-D object
H 011 Create 3-D wireframe models from 2-D geometry
H 012 Detail drawings
H 013 Assemble drawings

I BASIC CADD SKILLS - EDIT

I 001 Utilize geometry editing commands (eg. trimming, extending, scaling)
I 002 Utilize non-geometric editing commands (eg. text, drawing format)

J BASIC CADD SKILLS - MANIPULATE

J 001 Control coordinates and display scale
J 002 Control entity properties (eg. color, line type)
J 003 Use viewing commands (eg. dynamic rotation, zooming, panning)
J 004 Use display commands (eg. hidden line removal, shading)
J 005 Use standard parts and/or symbol libraries
J 006 Plot drawings on media using correct layout and scale
J 007 Use layering techniques
J 008 Use grouping techniques (eg. array, mirror, copy)
J 009 Minimize file size (eg. purge)
J 010 Define paper space verses model space

K BASIC CADD SKILLS - ANALYZE

K 001 Use query commands to interrogate database (eg. entity charact., distance, area, status)

L BASIC CADD SKILLS -DIMENSIONING

L 001 Use associative dimensioning

M ADVANCED CADD SKILLS - CREATE

M 001 Create wireframe and/or solid models
M 002 Create non-analytic surfaces using modeling (eg. NURBS, B-spline, Gordon, Bezier, Coons)
M 003 Create analytic surfaces using modeling with plane & curves (eg. conic, cylinder, ruled..)
M 004 Create offset surfaces
M 005 Find intersection of two surfaces
M 006 Create joined surfaces
M 007 Create a fillet or blend between two surfaces
M 008 Create feature based geometry (eg. holes, slots, rounds)
M 009 Create cut sections
M 010 Construct and label exploded assembly drawings
M 011 Perform Boolean operations (eg. union, subtraction, intersection)

N ADVANCED CADD SKILLS - EDIT

N 001 Trim surface
N 002 Manipulate surface normals
N 003 Extend surface
N 004 Edit control points (eg. surfaces, Bezier)
N 005 Modify geometry via Boolean operations
N 006 Edit primitives (eg. moving, copying, resizing)

O ADVANCED CADD SKILLS - MANIPULATE

O 001 Perform axis view clipping
O 002 Extract wireframe data from surface/solid geometry
O 003 Shade/render object (eg. reflectivity, opacity)

P ADVANCED CADD SKILLS - ANALYZE

P 001 Extract geometric data
P 002 Extract attribute
P 003 Identify gaps in non-intersecting surfaces (eg. geometric visualization)
P 004 Obtain surface properties (eg. area perimeter, bounded volume)
P 005 Obtain mass properties data (eg. moments of inertia, centroids)

Q ADVANCED CADD SKILLS - CADD PRODUCTIVITY AND WORK HABITS

Q 001 Customize to improve productivity (eg. menus, function keys, script files, macros)
Q 002 Manipulate associated non-graphical data (eg. word processing, attributes, spread sheets)
Q 003 Use template library files to establish drawing standard presets
Q 004 Develop geometry using parametric programs

The above skills were adapted from the National Occupational Skills Standards Project, 1994 developed by the Foundation for Industrial Modernization, Washington, D.C. and verified by the Industry/Education Advisory Group on May 4-5, 1995.

FOUNDATION SKILLS

R LANGUAGE ARTS

R 001 Adapts diction/structure audience
R 002 Appreciates author's style/approach characters, setting
R 003 Attends directions/task
R 004 Collects/organizes information-oral/written classifications, library resources, notes, research--formal
R 005 Composes/edits audio-visual aids
R 006 Composes/edits forms/documents W-4 forms, notes, outlines
R 007 Composes/edits reports/essays information requests, information supplying
R 008 Composes/edits sentences spelling
R 009 Comprehends information-written charts/tables/graphs
R 010 Describes/explains perceptual effects emotional tone
R 011 Evaluates information-oral adequacy/sufficiency, appropriateness, clarity, conclusions/solutions, relationship of ideas, validity
R 012 Evaluates information-written, adequacy/sufficiency, sources, abbreviations, context, fiction/non-fiction, key words/phrases, main idea, outcomes/solutions
R 013 Infers/predicts information-oral outcomes/solutions
R 014 Uses dictionary
R 015 Uses library resources guides
R 016 Uses text resources glossaries, indexes, table of contents
R 017 Uses thesaurus

S MATHEMATICS

S 001 Calculates/evaluates geometric figures area
S 002 Calculates/evaluates measurement precision
S 003 Computes addition complex fractions, decimals, fractions, whole numbers
S 004 Computes division decimals, fractions, whole numbers,
S 005 Computes multiplication decimals, fractions, whole numbers
S 006 Computes subtraction decimals, fractions, whole numbers,
S 007 Constructs graphs
S 008 Constructs lines parallel/perpendicular
S 009 Distinguishes equal/not equal
S 010 Distinguishes estimate/exact value
S 011 Distinguishes proportion/congruence
S 012 Estimates/rounds geometric figures volume
S 013 Formulates/verifies angles, acute/obtuse/right, complementary, supplementary
S 014 Identifies English measures length/volume/weight
S 015 Identifies lines parallel/perpendicular
S 016 Identifies lines rays/segment, vertical/horizontal
S 017 Identifies metric measures length/volume/weight
S 018 Interprets charts/tables/graphs
S 019 Interprets symbols <* >* =* e.g.
S 020 Interprets system of numbers place value
S 021 Measures direct angles
S 022 Measures direct distance
S 023 Measures direct volume
S 024 Measures indirect formulas
S 025 Measures metric distance
S 026 Measures metric temperature
S 027 Measures metric volume
S 028 Solves problems coordinate geometry
S 029 Solves problems formulas specified symbols
S 030 Solves problems proportion volume
S 031 Solves problems proportion weight
S 032 Solves problems right triangles
S 033 Understands geometric figures visual perception
S 034 Understands line/angle relationships
S 035 Uses calculator addition, division, multiplication, subtraction

T SCIENCE

T 001 Analyzes/evaluates environmental issues pollution, waste management
T 002 Applies/uses laboratory techniques safety
T 003 Applies/uses maps/charts/tables/graphs
T 004 Describes/explains electricity static
T 005 Describes/explains electromagnetism magnetic fields/force
T 006 Describes/explains energy mechanical, power, thermal
T 007 Describes/explains force balanced/unbalanced, force mass
T 008 Describes/explains heat conduction/convection, heat infrared, temperature
T 009 Describes/explains lenses human eye
T 010 Describes/explains light angle of incidence/reflection
T 011 Describes/explains light electromagnetic radiation
T 012 Describes/explains light lasers, light opaque, light translucent/transparent
T 013 Describes/explains motion speed, motion velocity
T 014 Describes/explains solutions solute
T 015 Identifies measurement units
T 016 Measures distance/length
T 017 Measures mass/weight
T 018 Uses computers information processing, problem solving

WORKPLACE SKILLS

The Workplace Skills listed below were developed by Illinois and validated in 25 states including Maryland for V-TECS (Vocational-Technical Education Consortium of States).

* The MSDE Industry/Education Advisory Group determined these workplace skills were most important for Computer Aided Drafting and Design

U DEVELOP AN EMPLOYMENT PLAN

U 001 Match interests to employment area *
U 002 Match aptitudes to employment area *
U 003 Identify short term work goals *
U 004 Match attitudes to job area *
U 005 Match personality type to job area *
U 006 Match physical capabilities to job area *
U 007 Identify career information from counseling sources *
U 008 Demonstrate a drug-free status *

V SEEK AND APPLY FOR EMPLOYMENT OPPORTUNITIES

V 001 Locate employment opportunities *
V 002 Identify job requirements *
V 003 Locate resources for finding employment *
V 004 Prepare a resume *
V 005 Prepare for job interview *
V 006 Identify conditions for employment *
V 007 Evaluate job opportunities *
V 008 Identify steps in applying for a job *
V 009 Write job application letter *
V 010 Write interview follow-up letter *
V 011 Complete job application form *
V 012 Identify attire for job interview *

W ACCEPT EMPLOYMENT

W 001 Apply for social security number *
W 002 Complete state and federal tax forms *
W 003 Accept or reject employment offer *
W 004 Complete Employee's Withholding Allowance Certificat: Form W-4 *

X COMMUNICATE ON THE JOB

X 001 Communicate orally with others
X 002 Use telephone etiquette
X 003 Interpret the use of body language
X 004 Prepare written communication
X 005 Follow written directions *
X 006 Ask questions about task *

Y INTERPRET THE ECONOMICS OF WORK

Y 001 Identify the role of business in the economic system
Y 002 Describe responsibilities of employee *
Y 003 Describe responsibilities of employer or management *
Y 004 Investigate opportunities and options for business ownership
Y 005 Assess entrepreneurship skills

Z MAINTAIN PROFESSIONALISM

Z 001 Participate in employment orientation *
Z 002 Assess business image, products and/or services *
Z 003 Identify positive behavior *
Z 004 Identify company dress and appearance standards *
Z 005 Participate in meetings *
Z 006 Identify work-related terminology *
Z 007 Identify how to treat people with respect *

AA ADAPT AND COPE WITH CHANGE

AA 001 Identify elements of job transition
AA 002 Formulate transition plan
AA 003 Identify implementation procedures for a transition plan
AA 004 Evaluate the transition plan
AA 005 Exhibit ability to handle stress *
AA 006 Recognize need to change or quit a job
AA 007 Write a letter of resignation

BB SOLVE PROBLEMS AND THINK CRITICALLY

BB 001 Identify the problem *
BB 002 Clarify purposes and goals
BB 003 Identify solutions to a problem and their impact
BB 004 Employ reasoning skills *
BB 005 Evaluate options *
BB 006 Set priorities *
BB 007 Select and implement a solution to a problem
BB 008 Evaluate results of implemented option
BB 009 Organize workloads *
BB 010 Assess employer and employee responsibility in solving a problem *

CC MAINTAIN SAFE AND HEALTHY WORK ENVIRONMENT

CC 001 Identify safety and health rules/procedures *
CC 002 Demonstrate the knowledge of equipment in the work place *
CC 003 Identify conservation and environmental practices and policies *
CC 004 Act during emergencies *
CC 005 Maintain work area *
CC 006 Identify hazardous substances in the work place *

DD DEMONSTRATE WORK ETHICS AND BEHAVIOR

DD 001 Identify established rules, regulations and policies *
DD 002 Practice cost effectiveness *
DD 003 Practice time management *
DD 004 Assume responsibility for decisions and actions *
DD 005 Exhibit pride *
DD 006 Display initiative *
DD 007 Display assertiveness *
DD 008 Demonstrate a willingness to learn *
DD 009 Identify the value of maintaining regular attendance *
DD 010 Apply ethical reasoning *

EE DEMONSTRATE TECHNOLOGICAL LITERACY

EE 001 Demonstrate basic keyboarding skills. *
EE 002 Demonstrate basic knowledge of computing. *
EE 003 Recognize impact of technological changes on tasks and people. *

FF MAINTAIN INTERPERSONAL RELATIONSHIPS

FF 001 Value individual diversity *
FF 002 Respond to praise or criticism *
FF 003 Provide constructive praise or criticism *
FF 004 Channel and control emotional reactions *
FF 005 Resolve conflicts *
FF 006 Display a positive attitude *
FF 007 Identify and react to sexual intimidation/harassment *

GG DEMONSTRATE TEAM WORK

GG 001 Identify style of leadership used in team work
GG 002 Match team member skills and group activity
GG 003 Work with team members *
GG 004 Complete a team task *
GG 005 Evaluate outcomes *

Primary Occupations Addressed by this Program

Drafter, Architectural
Drafter, Electrical
Drafter, Mechanical

Facilities

The facilities, equipment, and supplies used in the program are representative of the current technology and applications of business and industry.

Program Cluster: Construction and Development

CARPENTER

Program Title: Carpenter **CIP#: 46.02**

Program Description:

This instructional program prepares individuals to lay out, fabricate, erect, install, and repair wooden structures and fixtures using hand and power tools. The program includes instruction in common systems of framing, construction materials, estimating, and blueprint reading.

OCCUPATIONAL SKILLS

A ESTIMATE MATERIAL

A 001 Estimate forming materials*
A 002 Estimate concrete*
A 003 Estimate concrete block*
A 004 Estimate rough framing materials
A 005 Estimate roofing materials
A 006 Estimate exterior trim
A 007 Estimate windows
A 008 Estimate doors and jambs
A 009 Estimate interior underlayment
A 010 Estimate insulation
A 011 Estimate interior paneling/drywall
A 012 Estimate stairway materials
A 013 Estimate prefabricated cabinets
A 014 Estimate material for built-ins*
A 015 Estimate finish hardware*
A 016 Estimate siding

B LOCATE BUILDING PERIMETERS

B 001 Locate and square corners
B 002 Establish elevation reference points from bench mark
B 003 Establish footing grade*
B 004 Position structure using offset locations*

* Advanced Skills

C BUILD AND INSTALL FOUNDATION FORMS

C 001 Construct stud and sheathing wall form
C 002 Erect plywood panel wall form
C 003 Erect manufactured wall form
C 004 Construct stair forms
C 005 Construct boxes for specified openings
C 006 Construct footing forms
C 007 Strip forms
C 008 Construct beam forms
C 009 Install anchor bolt in concrete
C 010 Install anchor bolt in concrete block
C 011 Construct bulkhead forms
C 012 Construct forms for expansion and contraction joints in concrete slabs and walls
C 013 Install keyway for footings and foundations

D INSTALLING ROUGH FRAMING

D 001 Lay out measurements for floor framing
D 002 Install built-up wood girders
D 003 Install steel I-beams
D 004 Install manufactured girders
D 005 Install lolly columns
D 006 Construct built-up sills
D 007 Install termite shields and sill sealers
D 008 Install sill plate
D 009 Install dimensional lumber floor joists
D 010 Install floor trusses
D 011 Install laminated floor materials
D 012 Install wood, metal and solid bridging
D 013 Frame floor openings
D 014 Install subfloors
D 015 Lay out wall framing
D 016 Construct corner post and partition blocks
D 017 Construct headers for openings
D 018 Frame walls
D 019 Frame door and window openings
D 020 Align, square and brace walls
D 021 Install wind bracing
D 022 Erect and brace walls
D 023 Install locking plates

* Advanced Skills

D INSTALLING ROUGH FRAMING (Cont'd)

D 026 Install firestops and blocking
D 027 Install metal studs
D 028 Install roof trusses
D 029 Install gable roofs*
D 030 Install hip roofs*
D 031 Install hip and valley roofs*
D 032 Install intersecting roofs
D 033 Install wall and roof sheathing
D 034 Install dormers
D 035 Frame roof saddles/crickets
D 036 Frame roof opening
D 037 Install space sheathing for wood shingles roofs
D 038 Build and install stairs
D 039 Install manufactured stairs
D 040 Set metal door frames for masonry construction
D 041 Set metal window frames for masonry construction
D 042 Install underlayments over subflooring

E INSTALL ROOF COMPONENTS

E 001 Install chimney flashing
E 002 Install valley flashing
E 003 Install step flashing
E 004 Install composite strip shingles
E 005 Install wood shingles/shakes
E 006 Install roll roofing
E 007 Install roof vents
E 008 Install ridge vents
E 009 Install skylights
E 010 Install gutters and leaders

* Advanced Skills

F INSTALL EXTERIOR FINISHES

F 001 Construct box cornices*
F 002 Construct rake cornices*
F 003 Case exterior openings
F 004 Install wood jamb window units
F 005 Install exterior door jambs
F 006 Hang exterior doors
F 007 Install corner boards for wood siding
F 008 Install wood fascia
F 009 Install wood soffits
F 010 Install aluminum fascia and soffits
F 011 Install prefabricated columns
F 012 Install garage doors
F 013 Install metal or vinyl siding
F 014 Install composition siding
F 015 Install prefabricated storm door and window
F 016 Install bevel or lap siding
F 017 Install tongue-and-groove siding
F 018 Install wood shingle siding
F 019 Install panel siding
F 020 Install louvers
F 021 Install exterior shutters
F 022 Install replacement window units

G INSTALL INTERIOR FINISHES

G 001 Install batt insulation
G 002 Install rigid insulation
G 003 Install loose-fill insulation
G 004 Install vapor barriers
G 005 Install wall paneling
G 006 Install closet accessories
G 007 Install trim and millwork
G 008 Install drywall
G 009 Finish drywall
G 010 Case interior opening
G 011 Install interior doors
G 012 Install thresholds
G 013 Install interior door jambs
G 014 Install prehung door units (split jambs)
G 015 Install double-acting doors
G 016 Install folding (accordion) doors
G 017 Install sliding doors
G 018 Install bi-fold doors

* Advanced Skills

G INSTALL INTERIOR FINISHES (Cont'd)

G 019 Install pocket doors
G 020 Install cylinder locksets
G 021 Install mortise locksets
G 022 Install door hardware
G 023 Install weather stripping
G 024 Construct built-in cabinets*
G 025 Install wall cabinets
G 026 Install base cabinets/counters
G 027 Install recessed medicine cabinets
G 028 Install shelving
G 029 Install corner beading

H ASSEMBLE AND CONSTRUCT STAIRS

H 001 Install prefabricated stairs
H 002 Install disappearing stair units
H 003 Construct open riser stairs
H 004 Construct box stairs
H 005 Install wood newel post, balusters, and railings
H 006 Install metal newel post and railings
H 007 Construct landings/platforms

I APPLY SAFETY PRACTICES

I 001 Inspect and care for hand/power tools and equipment
I 002 Comply with MOSHA/OSHA safety requirements
I 003 Apply basic first aid
I 004 Maintain clean and safe work areas
I 005 Demonstrate use of fire extinguisher
I 006 Participate in safety training programs
I 007 Set up ladders, ladder jacks, and planks
I 008 Construct outrigger scaffolds
I 009 Construct single-pole scaffold
I 010 Construct double-pole scaffold
I 011 Erect metal scaffolds
I 012 Correct safety hazards

* Advanced Skills

J PERFORM SUPERVISORY AND RECORDKEEPING FUNCTIONS

J 001 Order and distribute supplies and materials*
J 002 Schedule and control the flow of job*
J 003 Maintain file and records*
J 004 Maintain inventory of supplies and equipment*
J 005 Write correspondences and reports*
J 006 Complete time cards
J 007 Manage employees (hire, evaluate, fire, etc.)*
J 008 Compute the costs of work completed*
J 009 Conduct training and meetings for employees*
J 010 Report problems to supervisor

* Advanced Skills

The skills on this list were adapted from the MSDE/CTAL Residential Carpenter TAP and the V-TECS Carpenter list.

FOUNDATION SKILLS

K LANGUAGE ARTS

K 001 Adapt strategy for listening, reading, speaking
K 002 Apply/use study habits/methods prior knowledge, skimming, test taking
K 003 Attend directions/task
K 004 Attend verbal cues
K 005 Collect/organize information - oral/written library resources, notes, outlines
K 006 Collect/organize information - oral/written observations, personal experiences
K 007 Collect/organize information - oral/written reading
K 008 Compose/edit audiovisual aids graphs
K 009 Compose/edit forms/documents job applications, resumes, W-4 forms
K 010 Compose/edit oral presentations structure
K 011 Compose/edit paragraphs cause/effect relationships, coherence, details, sequence
K 012 Compose/edit paragraphs topic sentences/main idea
K 013 Compose/edit paragraphs transitions
K 014 Compose/edit reports/essays evaluations/critiques, information requests
K 015 Compose/edit reports/essays information requests
K 016 Compose/edit sentences adjectives, adverbs, capitalization, completeness
K 017 Compose/edit sentences Direct/indirect object
K 018 Compose/edit sentences fragments - w/o, irregular expressions - w/o
K 019 Compose/edit sentences modifiers, nouns. order of words, predicates, pronouns
K 020 Compose/edit sentences punctuation
K 021 Compose/edit sentences run-on - w/o, spelling, subject/verb agreement, subjects
K 022 Compose/edit sentences verbs
K 023 Compose/edit social communications/letters business
K 024 Comprehend information - oral cause/effect relationships, comparisons/contrasts
K 025 Comprehend information - oral conclusions, context, main idea, purpose, rationale
K 026 Comprehend information - written charts/tables/graphs, comparisons/contrasts
K 027 Comprehend information - written conclusions, context, evaluation/critiques

K LANGUAGE ARTS (Cont'd)

K 028 Comprehend information - written main idea, purpose, rationale, sequence, summaries
K 029 Evaluate information - oral appropriateness, conclusions/solutions, fact/opinion
K 030 Evaluate information - oral relationship of ideas, relevant/irrelevant
K 031 Evaluate information - oral Sources
K 032 Evaluate information - written conclusions/solutions, written relationship of ideas
K 033 Evaluate information - written relevant/irrelevant, written sources
K 034 Infer/predict information - oral cause/effect relationships, comparisons/contrasts
K 035 Infer/predict information - oral context, details, main idea, outcomes/solutions

L MATHEMATICS

L 001 Calculate/evaluate congruent triangles
L 002 Calculate/evaluate geometric figures circumference, perimeter, surface area
L 003 Calculate/evaluate linear relationship ordered pairs
L 004 Calculate/evaluate measurement precision
L 005 Compute addition complex fractions, numbers
L 006 Compute addition decimals, fractions, mentally, mixed numbers, whole numbers
L 007 Compute division complex fractions, decimals, fractions, mentally, mixed numbers
L 008 Compute division whole numbers
L 009 Compute expected values formula
L 010 Compute multiplication complex fractions, decimals, fractions, mentally
L 011 Compute multiplication mixed numbers, whole numbers
L 012 Compute Subtraction complex fractions, decimals, fractions, mentally
L 013 Compute Subtraction mixed numbers, whole numbers
L 014 Construct angles angle bisectors
L 015 Construct geometric figures
L 016 Construct lines parallel/perpendicular
L 017 Convert fractions mixed numbers, reciprocal form, simplest form
L 018 Convert square units
L 019 Convert word problems mathematical expressions
L 020 Distinguish angles/circles/arcs
L 021 Distinguish estimate/exact value
L 022 Estimate/round angles
L 023 Estimate/round numbers add/subtract/divide/multiply
L 024 Formulate/verify angles acute/obtuse/right
L 025 Formulate/verify questions
L 026 Identify English measures length/volume/weight
L 027 Identify geometric figures circles/angles/arcs/polygons
L 028 Identify lines parallel/perpendicular
L 029 Identify lines vertical/horizontal
L 030 Interpret symbols <, >, =, e.g.
L 031 Measure direct angles
L 032 Measure direct distance
L 033 Measure direct time
L 034 Measure direct volume
L 035 Solve problems/formulas

L MATHEMATICS (Cont'd)

L 036 Solve problems/generate conclusions
L 037 Solve problems/proportion area
L 038 Solve problems/proportion volume, weight
L 039 Solve problems/right triangles Pythagorean theorem
L 040 Solve problems/trial and error
L 041 Understand geometric figures Visual perception
L 042 Understand line/angle
L 043 Use calculator addition, division, multiplication, subtraction

M SCIENCE

M 001 Analyze/evaluate environmental issues ecology, pollution, waste management
M 002 Apply/use maps/charts/tables/graphs
M 003 Convert measurement units
M 004 Describe/explain earth climate
M 005 Describe/explain earth erosion/weathering
M 006 Describe/explain earth movement, e.g. earthquakes
M 007 Describe/explain earth natural resources
M 008 Describe/explain earth water
M 009 Describe/explain energy thermal
M 010 Describe/explain energy/resources solar
M 011 Describe/explain sound carriers/insulators
M 012 Describe/explain sound noise/acoustics
M 013 Use computers information processing
M 014 Use computers mathematical applications
M 015 Use computers problem solving

WORKPLACE SKILLS

The Workplace Skills listed below were developed by Illinois and validated in 25 states, including Maryland, for V-TECS (Vocational-Technical Education Consortium of States).

The MSDE Industry/Education Advisory Group determined that all of the skills listed (except T 001, T 004, and T 007) were important for Carpenter.

N DEVELOP AN EMPLOYMENT PLAN

N 001 Match interests to employment area
N 002 Match aptitudes to employment area
N 003 Identify short term work goals
N 004 Match attitudes to job area
N 005 Match personality type to job area
N 006 Match physical capabilities to job area
N 007 Identify career information from counseling sources
N 008 Demonstrate a drug-free status

O SEEK AND APPLY FOR EMPLOYMENT OPPORTUNITIES

O 001 Locate employment opportunities
O 002 Identify job requirements
O 003 Locate resources for finding employment
O 004 Prepare a resume
O 005 Prepare for job interview
O 006 Identify conditions for employment
O 007 Evaluate job opportunities
O 008 Identify steps in applying for a job
O 009 Write job application letter
O 010 Write interview follow-up letter
O 011 Complete job application form
O 012 Identify attire for job interview

P ACCEPT EMPLOYMENT

P 001 Apply for social security number
P 002 Complete state and federal tax forms
P 003 Accept or reject employment offer
P 004 Complete Employee's Withholding Allowance Certificate Form W-4

Q COMMUNICATE ON THE JOB

Q 001 Communicate orally with others
Q 002 Use telephone etiquette
Q 003 Interpret the use of body language
Q 004 Prepare written communication
Q 005 Follow written directions
Q 006 Ask questions about task

R INTERPRET THE ECONOMICS OF WORK

R 001 Identify the role of business in the economic system
R 002 Describe responsibilities of employee
R 003 Describe responsibilities of employer or management
R 004 Investigate opportunities and options for business ownership
R 005 Assess entrepreneurship skills

S MAINTAIN PROFESSIONALISM

S 001 Participate in employment orientation
S 002 Assess business image, products and/or services
S 003 Identify positive behavior
S 004 Identify company dress and appearance standards
S 005 Participate in meetings
S 006 Identify work-related terminology
S 007 Identify how to treat people with respect

T ADAPT AND COPE WITH CHANGE

T 001 Identify elements of job transition
T 002 Formulate transition plan
T 003 Identify implementation procedures for a transition plan
T 004 Evaluate the transition plan
T 005 Exhibit ability to handle stress
T 006 Recognize need to change or quit a job
T 007 Write a letter of resignation

U SOLVE PROBLEMS AND THINK CRITICALLY

U 001 Identify the problem
U 002 Clarify purposes and goals
U 003 Identify solutions to a problem and their impact
U 004 Employ reasoning skills
U 005 Evaluate options
U 006 Set priorities
U 007 Select and implement a solution to a problem
U 008 Evaluate results of implemented option
U 009 Organize workloads
U 010 Assess employer and employee responsibility in solving a problem

V MAINTAIN SAFE AND HEALTHY WORK ENVIRONMENT

V 001 Identify safety and health rules/procedures
V 002 Demonstrate the knowledge of equipment in the work place
V 003 Identify conservation and environmental practices and policies
V 004 Act during emergencies
V 005 Maintain work area
V 006 Identify hazardous substances in the work place

W DEMONSTRATE WORK ETHICS AND BEHAVIOR

W 001 Identify established rules, regulations and policies
W 002 Practice cost effectiveness
W 003 Practice time management
W 004 Assume responsibility for decisions and actions
W 005 Exhibit pride
W 006 Display initiative
W 007 Display assertiveness
W 008 Demonstrate a willingness to learn
W 009 Identify the value of maintaining regular attendance
W 010 Apply ethical reasoning

X DEMONSTRATE TECHNOLOGICAL LITERACY

X 001 Demonstrate basic keyboarding skills
X 002 Demonstrate basic knowledge of computing
X 003 Recognize impact of technological changes on tasks and people

Y MAINTAIN INTERPERSONAL RELATIONSHIPS

Y 001 Value individual diversity
Y 002 Respond to praise or criticism
Y 003 Provide constructive praise or criticism
Y 004 Channel and control emotional reactions
Y 005 Resolve conflicts
Y 006 Display a positive attitude
Y 007 Identify and react to sexual intimidation/harassment

Z DEMONSTRATE TEAM WORK

Z 001 Identify style of leadership used in team work
Z 002 Match team member skills and group activity
Z 003 Work with team members
Z 004 Complete a team task
Z 005 Evaluate outcomes

Primary Occupations Addressed by this Program

Rough Carpenter
Finish Carpenter

Facilities

The facilities, equipment, and supplies used in the program are representative of the current technology and applications of business and industry.

Program Cluster: Human Resource Services

CHILD CARE and GUIDANCE WORKERS

Program Title: Child Care and Guidance Management and Services **CIP#: 20.02**

Program Description:

This instructional program prepares individuals for occupations in child care and guidance, foster care/family day care, and teacher assistance, under the supervision of professional personnel. It includes instruction in child growth and development; nutrition; program planning and management; safety and behavior guidance; recreation, play and learning activities; child abuse and neglect prevention; parent-child interpersonal relationships; and laws, regulations and policies relating to provide child care services and maintenance of children's environments.

OCCUPATIONAL SKILLS

A ADMINISTER CHILD CARE PROGRAMS

A 001 Develop recordkeeping system*
A 002 Schedule children*
A 003 Participate in staff meetings*
A 004 Conduct staff development activities*
A 005 Conduct employee evaluation(s)*
A 006 Promote child care program*
A 007 Interview prospective clients*
A 008 Establish emergency evacuation procedure*
A 009 Plan physical layout of facility*
A 010 Develop safety guidelines*
A 011 Contract for maintenance service(s)*

B PERFORM ADMINISTRATIVE SUPPORT ACTIVITIES

B 001 Maintain children's records
B 002 Prepare informational correspondences
B 003 Perform receptionist duties
B 004 Requisition furniture, equipment & supplies
B 005 Prepare illness and accident reports
B 006 Prepare child abuse/neglect report
B 007 Collect fees

* Advanced skills

B PERFORM ADMINISTRATIVE SUPPORT ACTIVITIES (Cont'd)

B 008 Organize and maintain storage space
B 009 Set up learning areas
B 010 Record observations of child at play
B 011 Identify other agencies and resources (professional organizations, child advocacy groups, child find etc.)

C PROVIDE FOR HEALTH AND PHYSICAL NEEDS OF CHILDREN

C 001 Orient child to day care center
C 002 Identify and report illness or discomfort in children (including suspected abuse/neglect)
C 003 Perform a visual health check
C 004 Supervise dental hygiene activities
C 005 Supervise children dressing and undressing
C 006 Supervise bathroom activities
C 007 Organize and supervise rest period
C 008 Provide care for injured or ill child
C 009 Identify resources available for special needs

D PERFORM FOOD SERVICE ACTIVITIES

D 001 Identify childrens' individual dietary needs
D 002 Prepare weekly meal plan
D 003 Purchase food and supplies
D 004 Store food and supplies
D 005 Prepare snacks and meals
D 006 Serve food
D 007 Monitor and report food consumption to parents
D 008 Maintain a sanitary environment
D 009 Wash and store kitchen equipment and utensils

E CONDUCT LEARNING ACTIVITIES

E 001 Organize and guide show and tell time
E 002 Organize and guide reading activities
E 003 Assist child in use of toys or play equipment
E 004 Organize and guide music & singing activities
E 005 Organize and guide sand and water play
E 006 Organize and guide dramatic play activities
E 007 Organize and guide story time
E 008 Organize and guide calendar activities
E 009 Organize and guide math activities
E 010 Organize and guide computer activities
E 011 Organize and guide activities for children with special needs

E CONDUCT LEARNING ACTIVITIES (Cont'd)

E 012 Organize and guide art activities
E 013 Organize and guide food preparation activities
E 014 Organize and guide free-choice play activities
E 015 Supervise special activities (parties, field trips, resource persons, holiday events)
E 016 Organize and guide nature and science activities
E 017 Organize and guide arrival and dismissal
E 018 Organize and guide clean-up activities
E 019 Guide homework activities of school-age children
E 020 Manage children's behavior

F ASSIST IN PLANNING ACTIVITIES OR PROGRAMS

F 001 Organize recreational games.
F 002 Plan special activities (parties, field trips resource persons, holiday events, etc.)
F 003 Select play activity for developing large motor skills
F 004 Select play activities for developing small motor skills
F 005 Assist in planning all learning activities
F 006 Develop learning goals and objectives
F 007 Develop daily, weekly and monthly schedules
F 008 Develop lesson plans
F 009 Organize and arrange learning materials
F 010 Revise lesson plans based on implementation and feed back

G PREPARE TEACHING AIDS

G 001 Operate audio-visual equipment
G 002 Operate laminating equipment
G 003 Prepare modeling compound
G 004 Prepare paints
G 005 Prepare bulletin board display
G 006 Decorate rooms
G 007 Display children's work

H GUIDE SOCIAL AND EMOTIONAL DEVELOPMENT

H 001 Specify and apply the rules/consequences consistently
H 002 Settle quarrel
H 003 Talk with infant to stimulate vocalization
H 004 Assist child to deal with emotional upset
H 005 Promote good social attitudes among children

I WORK WITH PARENTS

I 001 Conduct parent/guest orientation
I 002 Participate in parent meeting
I 003 Conduct parent/guardian conference
I 004 Contact parent/guardian in emergency
I 005 Refer parent/guardian to other agencies/resources
I 006 Maintain confidentiality
I 007 Provide general information to parents
I 008 Provide feed-back to parents

J MAINTAIN SANITARY ENVIRONMENT

J 001 Clean floors and furniture
J 002 Clean rest room and fixtures
J 003 Sanitize potty chair
J 004 Sanitize changing area
J 005 Launder soiled linen
J 006 Supervise routine clean up by children
J 007 Clean toys and equipment

K PERFORM SAFETY FUNCTIONS

K 001 Conduct inspection for safety hazards
K 002 Conduct emergency evacuation drill
K 003 Comply with COMAR regulations
K 004 Secure poisons and medications
K 005 Administer CPR
K 006 Administer first aid
K 007 Apply safety restraint when transporting child
K 008 Repair/report toys and equipment needing repair
K 009 Supervise care of pets
K 010 Supervise care of plants

L CARE FOR INFANTS AND TODDLERS

L 001 Lift and hold infants
L 002 Bathe infants
L 003 Change diapers and other clothes
L 004 Prepare infant formula and food
L 005 Bottle-feed infants
L 006 Spoon-feed infants
L 007 Feed toddler
L 008 Clean cribs and change linens
L 009 Assist in toilet training toddlers

L CARE FOR INFANTS AND TODDLERS (Cont'd)

L 010 Dress infant/toddler
L 011 Prepare infant/toddler for nap time
L 012 Set up rest area for infant/toddler nap time

FOUNDATION SKILLS

M LANGUAGE ARTS

M 001 Adapts diction/structure audience, purpose, situation
M 002 Adapts strategy listening, reading, speaking, writing
M 003 Adapts style audience, cultural differences, purpose
M 004 Applies/uses definitions, figures of speech simile
M 005 Applies/uses study habits/methods previewing, skimming, test-taking
M 006 Applies/uses study habits/methods prior knowledge
M 007 Attends directions/task
M 008 Attends nonverbal cues
M 009 Attends verbal cues
M 010 Collects/organizes information-oral/written, classifications, discussions
M 011 Collects/organizes information--oral/written library resources, written notes
M 012 Collects/organizes information-oral/written observations, written outlines
M 013 Collects/organizes information--oral/written personal experiences, written reading
M 014 Collects/organizes information--oral/written research--formal
M 015 Composes/edits agenda, audio-visual aids, journals/diaries
M 016 Composes/edits notes lecture
M 017 Composes/edits oral presentations structure
M 018 Composes/edits outlines
M 019 Composes/edits paragraphs cause/effect relationships, coherence, details, sequence
M 020 Composes/edits paragraphs topic sentences/main idea
M 021 Composes/edits reports/essays evaluations/critiques, expositions,
M 022 Composes/edits reports/essays information requests
M 023 Composes/edits reports/essays information supplying
M 024 Composes/edits reports/essays narratives, persuasive text, proofs/revisions
M 025 Composes/edits reports/essays research-formal, summaries
M 026 Composes/edits sentences, adjectives, adverbs, capitalization, completeness
M 027 Composes/edits sentences direction/indirect object, fragments--w/o
M 028 Composes/edits sentences irregular expressions--w/o
M 029 Composes/edits sentences modifiers, nouns, order of words, predicates, pronouns
M 030 Composes/edits sentences punctuation, run-on--w/o, spelling,
M 031 Composes/edits sentences subject/verb agreement, subjects, verbs
M 032 Composes/edits social communications/letters business, letters personal
M 033 Comprehends information-oral assumptions/biases, cause/effect relationships
M 034 Comprehends information-oral character traits, comparisons/contrasts
M 035 Comprehends information-oral conclusions, oral context, main idea, purpose
M 036 Comprehends information-oral rationale

M LANGUAGE ARTS (Cont'd)

M 037 Comprehends information-written, written assumptions/biases
M 038 Comprehends information-written cause/effect relationships, written character traits
M 039 Comprehends information-written charts/tables/graphs
M 040 Describes/explains new words origin/development, perceptual effects
M 041 Evaluates information-oral, adequacy/sufficiency, appropriateness
M 042 Evaluates information-oral conclusions/solutions, fact/opinion, reality/fantasy
M 043 Evaluates information-written adequacy/sufficiency
M 044 Identifies information-written propaganda techniques
M 045 Identifies purpose/strategy listening, strategy reading, strategy speaking
M 046 Identifies purpose/strategy writing
M 047 Presents informal speech persuasive

N MATHEMATICS

N 001 Calculates/evaluates factors whole numbers/divisibility
N 002 Calculates/evaluates measurement precision
N 003 Calculates/evaluates percent in/decrease, markup/discount
N 004 Calculates/evaluates unit measure price
N 005 Computes addition decimals, fractions, mentally
N 006 Computes addition mixed numbers, whole numbers
N 007 Computes division decimals, fractions, mentally, mixed numbers, whole numbers
N 008 Computes multiplication decimals, fractions, mentally, mixed numbers
N 009 Computes multiplication whole numbers
N 010 Computes subtraction decimals, fractions, mentally, mixed numbers
N 011 Computes subtraction whole numbers
N 012 Constructs angles congruent angles
N 013 Constructs charts/tables/graphs data points
N 014 Constructs geometric figures compass/straight edge
N 015 Constructs lines parallel/perpendicular
N 016 Converts decimals/fractions ratios/percents
N 017 Converts word problems mathematical expressions
N 018 Distinguishes angles/circles/arcs
N 019 Estimates/rounds numbers add/subtract/divide/multiply
N 020 Identifies English measures length/volume/weight
N 021 Identifies fractions parts
N 022 Identifies geometric figure circles/angles/arcs/polygons
N 023 Identifies lines parallel/perpendicular
N 024 Interprets charts/tables/graphs
N 025 Measures direct distance, direct temperature, direct time, direct volume
N 026 Measures direct weight
N 027 Solves problems proportion area, volume, weight
N 028 Uses calculator addition, division, multiplication, subtraction

O Science

O 001 Analyzes/evaluates chemicals in society drugs, food additives, vitamins
O 002 Analyzes/evaluates environmental issues ecology, media information, pollution
O 003 Analyzes/evaluates environmental issues waste management
O 004 Applies/uses laboratory techniques, laboratory techniques safety & sanitation
O 005 Applies/uses maps/charts/tables/graphs
O 006 Applies/uses models/theories/laws
O 007 Applies/uses scientific methods observation--direct/indirect
O 008 Converts measurement units
O 009 Describes/explains earth history fossils/rocks
O 010 Describes/explains energy kinetic/potential, resources solar
O 011 Describes/explains heat temperature
O 012 Describes/explains human/animal development, digestive system, diseases
O 013 Describes/explains human/animal endocrine system, excretory system, hemoglobin
O 014 Describes/explains human/animal homeostasis, hormones, immune system
O 015 Describes/explains human/animal maintenance/management, metabolism
O 016 Describes/explains human/animal muscular system, nervous system
O 017 Describes/explains human/animal plasma, reproductive system, respiratory system
O 018 Describes/explains human/animal skeletal system, skin, tissues
O 019 Describes/explains human/animal weight gain/loss
O 021 Describes/explains plants parts/functions
O 022 Describes/explains plants temperature--role of
O 023 Describes/explains plants water
O 024 Describes/explains sound hearing
O 025 Describes/explains weather/climate ozone layer
O 026 Describes/explains weather/climate precipitation
O 027 Identifies animals
O 028 Identifies cycles weather
O 029 Identifies diseases
O 030 Identifies food groups
O 031 Identifies measurement units
O 032 Identifies organisms insects, plants
O 033 Measures distance/length
O 034 Measures temperature F/C
O 035 Measures time
O 036 Measures volume liquids/solids
O 037 Uses computers information processing

WORKPLACE SKILLS

The Workplace Skills listed below were developed by Illinois and validated in 25 states, including Maryland, for V-TECS (Vocational-Technical Education Consortium of States).

The MSDE Industry/Education Advisory Group determined that all of the skills listed were important for Child Care & Guidance Workers ** Underlined words were added to the V-TECS Generic Workplace Skills list by the MSDE Industry/Education Advisory Group.

P DEVELOP AN EMPLOYMENT PLAN

P 001 Match interests to employment area
P 002 Match aptitudes to employment area
P 003 Identify short term work goals
P 004 Match attitudes to job area
P 005 Match personality type to job area
P 006 Match physical capabilities to job area
P 007 Identify career information from counseling sources
P 008 Demonstrate a drug-free status

Q SEEK AND APPLY FOR EMPLOYMENT OPPORTUNITIES

Q 001 Locate employment opportunities
Q 002 Identify job requirements
Q 003 Locate resources for finding employment
Q 004 Prepare a resume
Q 005 Prepare for job interview
Q 006 Identify conditions for employment

R SEEK AND APPLY FOR EMPLOYMENT OPPORTUNITIES

R 007 Evaluate job opportunities
R 008 Identify steps in applying for a job
R 009 Write job application letter
R 010 Write interview follow-up letter
R 011 Complete job application form
R 012 Identify attire for job interview

S ACCEPT EMPLOYMENT

S 001 Apply for social security number
S 002 Complete state and federal tax forms
S 003 Accept or reject employment offer
S 004 Complete Employee's Withholding Allowance Certificate Form W-4

T COMMUNICATE ON THE JOB

T 001 Communicate orally with others
T 002 Use telephone etiquette
T 003 Interpret the use of body language
T 004 Prepare written communication
T 005 Follow written directions
T 006 Ask questions about task

U INTERPRET THE ECONOMICS OF WORK

U 001 Identify the role of business in the economic system
U 002 Describe responsibilities of employee
U 003 Describe responsibilities of employer or management
U 004 Investigate opportunities and options for business ownership
U 005 Assess entrepreneurship skills

V MAINTAIN PROFESSIONALISM

V 001 Participate in employment orientation
V 002 Assess business image, products and/or services
V 003 Identify and model positive behavior **
V 004 Identify company dress and appearance standards
V 005 Participate in meetings
V 006 Identify work-related terminology
V 007 Identify how to treat people with respect
V 008 Exhibit appropriate conduct before clients/customers **

W ADAPT AND COPE WITH CHANGE

W 001 Identify elements of job transition
W 002 Formulate transition plan
W 003 Identify implementation procedures for a transition plan
W 004 Evaluate the transition plan
W 005 Exhibit ability to handle stress
W 006 Recognize need to change or quit a job
W 007 Write a letter of resignation

X SOLVE PROBLEMS AND THINK CRITICALLY

X 001 Identify the problem
X 002 Clarify purposes and goals
X 003 Identify solutions to a problem and their impact
X 004 Employ reasoning skills
X 005 Evaluate options
X 006 Set priorities
X 007 Select and implement a solution to a problem

X SOLVE PROBLEMS AND THINK CRITICALLY (Cont'd)

X 008 Evaluate results of implemented option
X 009 Organize workloads
X 010 Assess employer and employee responsibility in solving a problem

Y MAINTAIN SAFE AND HEALTHY WORK ENVIRONMENT

Y 001 Identify safety and health rules/procedures
Y 002 Demonstrate the knowledge of equipment in the work place
Y 003 Identify conservation and environmental practices and policies
Y 004 Act during emergencies
Y 005 Maintain work area
Y 006 Identify hazardous substances in the work place

Z DEMONSTRATE WORK ETHICS AND BEHAVIOR

Z 001 Identify established rules, regulations and policies
Z 002 Practice cost effectiveness
Z 003 Practice time management
Z 004 Assume responsibility for decisions and actions
Z 005 Exhibit pride
Z 006 Display initiative
Z 007 Display assertiveness
Z 008 Demonstrate a willingness to learn
Z 009 Identify the value of maintaining regular attendance
Z 010 Apply ethical reasoning

AA DEMONSTRATE TECHNOLOGICAL LITERACY

AA 001 Demonstrate basic keyboarding skills
AA 002 Demonstrate basic knowledge of computing
AA 003 Recognize impact of technological changes on tasks and people

BB MAINTAIN INTERPERSONAL RELATIONSHIPS

BB 001 Value individual diversity
BB 002 Respond to praise or criticism
BB 003 Provide constructive praise or criticism
BB 004 Channel and control emotional reactions
BB 005 Resolve conflicts
BB 006 Display a positive attitude
BB 007 Identify and react to sexual intimidation/harassment

CC DEMONSTRATE TEAM WORK

CC 001 Identify style of leadership used in team work
CC 002 Match team member skills and group activity
CC 003 Work with team members
CC 004 Complete a team task
CC 005 Evaluate outcomes

Primary Occupations Addressed by this Program

Child Care Assistant - Day Care Centers, Nursery Schools, Private Homes
Child Care Assistant - Playgrounds, Recreation Centers, Hospitals, etc.
Teacher Aide - Pre-Primary and Primary Grades

Facilities

The facilities, equipment, and supplies used in the program are representative of the current technology and applications of this industry.

Ample work areas must be provided to accommodate the number of students enrolled at any time as well as adequate space for 10-15 young children

Program Cluster: Manufacturing, Engineering, and Technology

ELECTRONICS

Program Title: Industrial Electronics **CIP#: 47.01**

Program Description:

This instructional program prepares individuals to assemble, install, operate, maintain, and repair electrical/electronic equipment used in industry and manufacturing. The program includes instruction in using various types of equipment such as power supplies, amplifiers, motors, controls, digital and computer circuitry, synhcro- and servo- mechanisms, mechanical power transfer systems, and control circuitry.

Skill Descriptor:	Definition
Understand principles and operations of....	Know the technical basis for, and be able to explain how, the product/device/circuit works.
Fabricate and demonstrate.....	Build the product/device/circuit and show that it performs as expected.
Troubleshoot and repair....	Use a logical process to find the fault(s) in a product/device/circuit, replace and/or repair the defect and demonstrate corrected operation.
Demonstrate an understanding of....	Know the technical basis for the workings of a product/device/circuit/procedure and be able to apply that knowledge.

OCCUPATIONAL SKILLS

A GENERAL

A 001 Demonstrate proper safety techniques for all types of circuits and components
A 002 Demonstrate an understanding of and comply with relevant OSHA safety standards
A 003 Demonstrate an understanding of proper troubleshooting techniques
A 004 Demonstrate an understanding of basic assembly skills using hand and power tools
A 005 Demonstrate basic soldering/desoldering techniques, including through-hole and surface mount
A 006 Demonstrate an understanding of proper solderless connections
A 007 Use data books and cross reference/technical manuals to specify and requisition components
A 008 Interpret and create electronic schematics, technical drawings, and flow diagrams
A 009 Demonstrate an understanding of design curves, tables, graphs, and recording of data
A 010 Demonstrate an understanding of color codes and other component descriptors
A 011 Use listening skills or assistive devices to assess signs and symptoms of malfunctions

B DC CIRCUITS

B 001 Demonstrate an understanding of sources of electricity in DC circuits
B 002 Demonstrate an understanding of principles and operation of batteries
B 003 Define and explain relationships among/between voltage, current, resistance, DC power
B 004 Measure resistance of conductors and insulators and the computation of conductance
B 005 Apply Ohms Law to series, parallel and series-parallel circuits
B 006 Demonstrate an understanding of magnetic properties of circuits and devices
B 007 Explain the physical, electrical characteristics of capacitors and inductors
B 008 Understand principles and operations of DC series circuits
B 009 Fabricate and demonstrate DC series circuits
B 010 Troubleshoot and repair DC series circuits
B 011 Understand principles and operations of DC parallel circuits
B 012 Fabricate and demonstrate DC parallel circuits
B 013 Troubleshoot and repair DC parallel circuits
B 014 Understand the principles and operations of DC series-parallel and bridge circuits

B DC CIRCUITS (Cont'd)

B 015 Fabricate and demonstrate DC series-parallel and bridge circuits
B 016 Troubleshoot and repair DC series-parallel and bridge circuits
B 017 Understand the principles and operations of the Wheatstone Bridge
B 018 Understand principles and operations of DC voltage divider circuits (loaded and unloaded)
B 019 Fabricate and demonstrate DC voltage divider circuits (loaded and unloaded)
B 020 Troubleshoot and repair DC voltage divider circuits (loaded and unloaded)
B 021 Understand principles and operations of DC RC and RL circuits
B 022 Fabricate and demonstrate DC RC and RL circuits
B 023 Troubleshoot and repair DC RC and RL circuits
B 024 Demonstrate an understanding of measurement of power in DC circuits

C AC CIRCUITS

C 001 Demonstrate an understanding of sources of electricity in AC circuits
C 002 Demonstrate an understanding of the properties of an AC signal
C 003 Define principles of operation/characteristics of sinusoidal and non-sinusoidal wave forms
C 004 Demonstrate an understanding of basic motor/generator theory and operation
C 005 Demonstrate an understanding of measurement of power in AC circuits
C 006 Explain the principle & operation of isolation transformers, surge suppressors, uninterruptable power systems
C 007 Explain the principle and operation of safety grounding systems: lightning arresters, ground fault interrupters, etc.
C 008 Understand principles and operations of AC capacitive circuits
C 009 Fabricate and demonstrate AC capacitive circuits
C 010 Troubleshoot and repair AC capacitive circuits
C 011 Understand principles and operations of AC inductive circuits
C 012 Fabricate and demonstrate AC inductive circuits
C 013 Troubleshoot and repair AC inductive circuits
C 014 Understand principles and operations of AC circuits using transformers
C 015 Demonstrate an understanding of impedence matching theory
C 016 Fabricate and demonstrate AC circuits using transformers
C 017 Troubleshoot and repair AC circuits using transformers
C 018 Explain principles and operations of AC differentiator and integrator circuits
C 019 Fabricate and demonstrate AC differentiator and integrator circuits
C 020 Troubleshoot and repair AC differentiator and integrator circuits
C 021 Understand principles and operations of AC series and parallel resonant circuits
C 022 Fabricate and demonstrate AC series and parallel resonant circuits
C 023 Troubleshoot and repair AC series and parallel resonant circuits
C 024 Understand principles and operations of AC RC, RL, and RLC circuits

C AC CIRCUITS (Cont'd)

C 025 Fabricate and demonstrate AC RC, RL, and RLC circuits
C 026 Troubleshoot and repair AC RC, RL, and RLC circuits
C 027 Understand principles and operations of AC frequency selective filter circuits
C 028 Fabricate and demonstrate AC frequency selective filter circuits
C 029 Troubleshoot and repair AC frequency selective filter circuits
C 030 Understand principles and operations of AC polyphase circuits
C 031 Understand principles and operations of AC phase locked loop circuits
C 032 Troubleshoot and repair AC phase locked loop circuits

D DISCRETE SOLID STATE DEVICES

D 001 Demonstrate an understanding of the properties of semiconductor materials
D 002 Demonstrate an understanding of PN junctions
D 003 Demonstrate an understanding of bipolar transistors
D 004 Demonstrate an understanding of field effect transistors (FET's/MOS-FET's)
D 005 Demonstrate an understanding of special diodes and transistors
D 006 Understand principles and operations of diode circuits
D 007 Fabricate and demonstrate diode circuits
D 008 Troubleshoot and repair diode circuits
D 009 Understand principles and operation of optoelectronic devices
D 010 Fabricate and demonstrate optoelectronic devices
D 011 Troubleshoot/repair optoelectronic devices
D 012 Understand principles and operations of single stage amplifiers
D 013 Fabricate and demonstrate single stage amplifiers
D 014 Troubleshoot and repair single stage amplifiers
D 015 Understand principles and operations of thyristor circuitry (SCR, TRIAC, DIAC, etc.)
D 016 Fabricate and demonstrate thyristor circuitry (SCR, TRIAC, DIAC, etc.)
D 017 Troubleshoot and repair thyristor circuitry (SCR, TRIAC, DIAC, etc.)

E ANALOG CIRCUITS

E 001 Understand principles and operations of multistage amplifiers
E 002 Fabricate and demonstrate multistage amplifiers
E 003 Troubleshoot and repair multistage amplifiers
E 004 Understand principles and operations of IF circuits
E 005 Fabricate and demonstrate IF circuits
E 006 Troubleshoot and repair IF circuits
E 007 Understand principles and operations of linear power supplies and filters
E 008 Fabricate and demonstrate linear power supplies and filters
E 009 Troubleshoot and repair linear power supplies and filters
E 010 Understand principles and operations of operational amplifier circuits
E 011 Fabricate and demonstrate operational amplifier circuits

E ANALOG CIRCUITS (Cont'd)

E 012 Troubleshoot and repair operational amplifier circuits
E 013 Understand principles and operations of audio power amplifiers
E 014 Fabricate and demonstrate audio power amplifiers
E 015 Troubleshoot and repair audio power amplifiers
E 016 Understand principles and operations of regulated and switching power supply circuits
E 017 Troubleshoot and repair regulated and switching power supply circuits
E 018 Understand principles and operations of active filter circuits
E 019 Troubleshoot and repair active filter circuits
E 020 Understand principles and operations of sinusoidal and non-sinusoidal oscillator circuits
E 021 Troubleshoot and repair sinusoidal and non-sinusoidal oscillator circuits
E 022 Understand principles and operations of fiber optic circuits using photodiodes or LASERS
E 023 Troubleshoot and repair fiber optic circuits using photodiodes or LASERS
E 024 Understand principles and operations of RF circuits
E 025 Fabricate and demonstrate RF circuits
E 026 Troubleshoot and repair RF circuits
E 027 Understand principles and operations of signal modulation systems (AM, FM, stereo)
E 028 Troubleshoot and repair signal modulation systems (AM, FM, stereo)
E 029 Demonstrate an understanding of motor phase shift control circuits
E 030 Understand the principles and operations of microwave circuits

F DIGITAL CIRCUITS

F 001 Explain characteristics of integrated circuit (IC) logic families
F 002 Demonstrate an understanding of minimizing logic circuits using Boolean operations
F 003 Understand principles and operations of linear integrated circuits
F 004 Troubleshoot and repair linear integrated circuits
F 005 Understand principles and operations of types of logic gates
F 006 Fabricate and demonstrate types of logic gates
F 007 Troubleshoot and repair types of logic gates
F 008 Understand principles and operations of combinational logic circuits
F 009 Fabricate and demonstrate combinational logic circuits
F 010 Troubleshoot and repair combinational logic circuits
F 011 Understand principles and operations of types of flip-flop circuits
F 012 Fabricate and demonstrate types of flip-flop circuits
F 013 Troubleshoot and repair flip-flop circuits
F 014 Understand principles and operations of types of registers and counters
F 015 Fabricate and demonstrate types of registers and counters
F 016 Troubleshoot and repair types of registers and counters
F 017 Understand principles and operations of clock and timing circuits

F DIGITAL CIRCUITS (Cont'd)

F 018 Fabricate and demonstrate clock and timing circuits
F 019 Troubleshoot and repair clock and timing circuits
F 020 Understand principles and operations of types of arithmetic-logic circuits
F 021 Troubleshoot and repair types of arithmetic-logic circuits
F 022 Understand principles and operations of types of multiplexer and demultiplexer circuits
F 023 Troubleshoot and repair types of multiplexer and demultiplexer circuits
F 024 Understand principles and operations of types of digital to analog and analog to digital circuits
F 025 Troubleshoot and repair types of digital to analog and analog to digital circuits
F 026 Understand principles and operations of types of digital display circuits
F 027 Troubleshoot and repair types of digital display circuits
F 028 Understand principles and operations of power distribution noise problems (EMI)
F 029 Troubleshoot and repair power distribution noise problems
F 030 Understand principles and operations of types of digital encoders and decoders
F 031 Troubleshoot and repair types of digital encoders and decoders
F 032 Understand principles and operations of digital display devices
F 033 Troubleshoot and repair digital display devices

G MICROPROCESSORS

G 001 Demonstrate an understanding of microprocessor interfaces
G 002 Troubleshoot and repair microprocessor interfaces
G 003 Demonstrate an understanding of essential microprocessor components
G 004 Demonstrate an understanding of microprocessor BUS concepts
G 005 Demonstrate an understanding of microprocessor components and terminology
G 006 Understand principles and operation of types of microprocessor memory circuits
G 007 Troubleshoot and repair types of microprocessor memory circuits
G 008 Understand principles and operation of Microprocessor machine code and instruction sets

H MICROCOMPUTERS

H 001 Demonstrate an understanding of microcomputer operating systems
H 002 Demonstrate an understanding of essential microcomputer components
H 003 Demonstrate an understanding of microcomputer peripherals
H 004 Set up and configure a microcomputer using operating systems and software packages
H 005 Troubleshoot and replace microcomputer peripherals

ADDITIONAL SKILLS

J COMMUNICATIONS

J 001 Understand basic principles of transmission line applications
J 002 Understand basic principles of antenna systems
J 003 Understand basic principles of types of multiplexing systems
J 004 Understand basic principles of data communications
J 005 Understand basic principles of types of telephone switching systems
J 006 Understand basic principles of microwave communications systems

K ELECTROMECHANICS

K 001 Understand basic principles of servomechanisms, motors, and motor control circuits
K 002 Understand basic principles of mechanisms, linkages and levers
K 003 Understand basic principles of transducers and instrumentation
K 004 Understand basic principles of industrial materials
K 005 Understand basic principles of automatic controls and robotics

L LASER APPLICATIONS

L 001 Understand basic principles of data recording and manipulation
L 002 Understand basic principles of environmental testing and monitoring
L 003 Understand basic principles of nondestructive testing
L 004 Understand basic principles of measurement
L 005 Understand basic principles of communications
L 006 Understand basic principles of fiber optics and lasers

* Adapted from the Electronics Technician National Skill Standards Project - Basic and Practical Skills, 1994, Electronic Industries Foundation, Washington D.C.

FOUNDATION SKILLS

M LANGUAGE ARTS

M 001 Collects/organizes information-oral/written classifications, library resources
M 002 Comprehends information-oral assumptions/biases, main idea, purpose
M 003 Comprehends information-written cause/effect relationships, comparisons/contrasts
M 004 Comprehends information-written conclusions, evaluations/critiques
M 005 Comprehends information-written main idea, plot, purpose, sequence
M 006 Evaluates information-oral adequacy/sufficiency, relevant/irrelevant
M 007 Evaluates information-written adequacy/sufficiency, conclusions/solutions
M 008 Evaluates information-written relationship of ideas, relevant/irrelevant
M 009 Evaluates information-written sources, abbreviations, context, main idea,
M 010 Identifies information-written outcomes/solutions
M 011 Infers/predicts information-oral main idea
M 012 Infers/predicts information-written cause/effect relationships
M 013 Infers/predicts information-written comparisons/contrasts
M 014 Infers/predicts information-written outcomes/solutions
M 015 Infers/predicts information-written rational
M 016 Uses text resources, glossaries, indexes, table of contents

N MATHEMATICS

N 001 Calculates/evaluates measurement precision
N 002 Calculates/evaluates percent in/decrease, markup/discount
N 003 Calculates/evaluates prime numbers
N 004 Calculates/evaluates reasoning invalid arguments
N 005 Computes addition decimals, mentally, mixed numbers,
N 006 Computes division decimals
N 007 Computes division mentally, mixed numbers,
N 008 Computes multiplication decimals, mixed numbers,
N 009 Computes subtraction decimals, mixed numbers
N 010 Constructs graphs of function trigonometric functions
N 011 Converts angles degree/radian measurement
N 012 Converts formula equivalent form
N 013 Converts fractions mixed numbers
N 014 Converts fractions reciprocal form
N 015 Distinguishes deductive/inductive reasoning
N 016 Distinguishes estimate/exact value
N 017 Estimates/rounds expected outcomes
N 018 Estimates/rounds geometric figures, area, circumference, perimeter
N 019 Estimates/rounds geometric figures volume, weight
N 020 Estimates/rounds numbers add/subtract/divide/multiply
N 021 Formulates/verifies arguments valid/invalid
N 022 Formulates/verifies conclusions

N MATHEMATICS (Cont'd)

N 023 Formulates/verifies questions
N 024 Identifies English measures length/volume/weight
N 025 Identifies fractions parts
N 026 Identifies geometric figure circles/angles/arcs/polygons
N 027 Identifies graphs of function
N 028 Identifies lines parallel/perpendicular
N 029 Identifies lines rays/segment
N 030 Identifies lines vertical/horizontal
N 031 Identifies metric measures length/volume/weight
N 032 Identifies missing/irrelevant data word problems
N 033 Interprets charts/tables/graphs
N 034 Interprets symbols $<^*$ $>^*$ $=^*$ e.g.
N 035 Interprets system of numbers place value
N 036 Interprets system of numbers rational numbers* e.g. fractions
N 037 Measures direct angles, distance, temperature, time
N 038 Measures direct volume, direct weight
N 039 Measures indirect formulas
N 040 Measures metric distance
N 041 Measures metric temperature
N 042 Measures metric volume
N 043 Measures metric weight
N 044 Orders rational numbers
N 045 Orders rational numbers number line
N 046 Solves equations exponential analytic
N 047 Solves equations linear analytic
N 048 Solves equations quadratic
N 049 Solves equations systems of quadratic formula
N 050 Solves equations trigonometric analytic
N 051 Solves inequalities quadratic formula
N 052 Solves problems formulas specified symbols
N 053 Solves problems fractions/decimals/ratios/percents
N 054 Solves problems fractions/decimals/ratios/percents direct/indirect variation
N 055 Solves problems proportion area, proportion volume, proportion weight
N 056 Solves problems right triangles
N 057 Solves problems right triangles cosines/sines/tangents
N 058 Understands geometric figures visual perception
N 059 Understands line/angle relationships
N 060 Understands linear systems solutions
N 061 Understands power/exponent
N 062 Uses calculator addition, division, exponential functions, multiplication, subtraction
N 063 Uses calculator trigonometric functions cosines/sines/tangents

O SCIENCE

O 001 Analyzes/evaluates experiments conclusions, data
O 002 Applies/uses laboratory instruments
O 003 Applies/uses laboratory techniques safety
O 004 Applies/uses maps/charts/tables/graphs
O 005 Applies/uses scientific methods analysis--qualitative/quantitative
O 006 Applies/uses scientific methods data gathering
O 007 Applies/uses scientific methods observation--direct/indirect
O 007 Applies/uses scientific methods predictions
O 008 Applies/uses scientific methods problem identification
O 009 Describes/explains chemical reactions energy changes
O 010 Describes/explains color rainbow, color spectrum
O 011 Describes/explains conservation minerals
O 012 Describes/explains electricity charging
O 013 Describes/explains electricity conductors/insulators
O 014 Describes/explains electricity coulomb's law
O 015 Describes/explains electricity currents--direct/alternating
O 016 Describes/explains electricity ground
O 017 Describes/explains electricity lightning
O 018 Describes/explains electricity parallel/series circuits
O 019 Describes/explains electricity short circuit
O 020 Describes/explains electricity static
O 021 Describes/explains electricity transistor
O 022 Describes/explains electricity--generating, hydroelectric, incandescent
O 023 Describes/explains electricity--generating motors
O 024 Describes/explains electricity--generating solar
O 025 Describes/explains electricity--generating steam, e.g., nuclear
O 026 Describes/explains electricity--generating transformers
O 027 Describes/explains electricity--measurement ammeter/voltmeter
O 028 Describes/explains electricity--measurement ampere, measurement fuse
O 029 Describes/explains electricity--measurement galvanometer
O 030 Describes/explains electricity--measurement Ohm's law
O 031 Describes/explains electricity--measurement resistance, measurement voltage
O 032 Describes/explains electromagnetism, coil, earth
O 033 Describes/explains electromagnetism magnetic fields/force
O 034 Describes/explains electromagnetism magnetic poles
O 035 Describes/explains electromagnetism magnets
O 036 Describes/explains electrons electric charges
O 037 Describes/explains energy conversion
O 038 Describes/explains energy mechanical
O 039 Describes/explains energy thermal
O 040 Describes/explains energy/resources solar
O 041 Describes/explains force gravity
O 042 Describes/explains light angle of incidence/reflection
O 043 Describes/explains light critical angle--fiber optics

O SCIENCE (Cont'd)

O 044 Describes/explains light diffraction
O 045 Describes/explains light electromagnetic radiation
O 046 Describes/explains light electromagnetic spectrum
O 047 Describes/explains light lasers
O 048 Describes/explains light refraction
O 049 Describes/explains light translucent/transparent
O 050 Describes/explains light ultraviolet
O 051 Describes/explains matter density
O 052 Describes/explains matter properties
O 053 Describes/explains motion action/reaction
O 054 Describes/explains sound frequency--hertz
O 055 Describes/explains sound resonance
O 056 Describes/explains weather/climate atmosphere
O 057 Describes/explains work levers
O 058 Describes/explains work pulleys
O 059 Measures distance/length
O 060 Measures electric currents
O 061 Uses computers Information processing
O 062 Uses computers problem solving

WORKPLACE SKILLS

The Workplace Skills listed below were developed by Illinois and validated in 25 states including Maryland for V-TECS (Vocational-Technical Education Consortium of States).

The MSDE Industry/Education Advisory Group determined that all of the skills listed (except R001, V001-V004, V006-V007) were important for Electronics.

P DEVELOP AN EMPLOYMENT PLAN

P 001 Match interests to employment area
P 002 Match aptitudes to employment area
P 003 Identify short term work goals
P 004 Match attitudes to job area
P 005 Match personality type to job area
P 006 Match physical capabilities to job area
P 007 Identify career information from counseling sources
P 008 Demonstrate a drug-free status

Q SEEK AND APPLY FOR EMPLOYMENT OPPORTUNITIES

Q 001 Locate employment opportunities
Q 002 Identify job requirements
Q 003 Locate resources for finding employment
Q 004 Prepare a resume
Q 005 Prepare for job interview
Q 006 Identify conditions for employment
Q 007 Evaluate job opportunities
Q 008 Identify steps in applying for a job
Q 009 Write job application letter
Q 010 Write interview follow-up letter
Q 011 Complete job application form
Q 012 Identify attire for job interview

R ACCEPT EMPLOYMENT

R 001 Apply for social security number
R 002 Complete state and federal tax forms
R 003 Accept or reject employment offer
R 004 Complete Employee's Withholding Allowance Certificate Form W-4

S COMMUNICATE ON THE JOB

S 001 Communicate orally with others
S 002 Use telephone etiquette
S 003 Interpret the use of body language
S 004 Prepare written communication
S 005 Follow written directions
S 006 Ask questions about task

T INTERPRET THE ECONOMICS OF WORK

T 001 Identify the role of business in the economic system
T 002 Describe responsibilities of employee
T 003 Describe responsibilities of employer or management
T 004 Investigate opportunities and options for business ownership
T 005 Assess entrepreneurship skills

U MAINTAIN PROFESSIONALISM

U 001 Participate in employment orientation
U 002 Assess business image, products and/or services
U 003 Identify positive behavior
U 004 Identify company dress and appearance standards
U 005 Participate in meetings
U 006 Identify work-related terminology
U 007 Identify how to treat people with respect

V ADAPT AND COPE WITH CHANGE

V 001 Identify elements of job transition
V 002 Formulate transition plan
V 003 Identify implementation procedures for a transition plan
V 004 Evaluate the transition plan
V 005 Exhibit ability to handle stress
V 006 Recognize need to change or quit a job
V 007 Write a letter of resignation

W SOLVE PROBLEMS AND THINKING CRITICALLY

W 001 Identify the problem
W 002 Clarify purposes and goals
W 003 Identify solutions to a problem and their impact
W 004 Employ reasoning skills
W 005 Evaluate options
W 006 Set priorities
W 007 Select and implement a solution to a problem
W 008 Evaluate results of implemented option
W 009 Organize workloads
W 010 Assess employer and employee responsibility in solving a problem

X MAINTAIN A SAFE AND HEALTHY WORK ENVIRONMENT

X 001 Identify safety and health rules/procedures
X 002 Demonstrate the knowledge of equipment in the work place
X 003 Identify conservation and environmental practices and policies
X 004 Act during emergencies
X 005 Maintain work area
X 006 Identify hazardous substances in the work place

Y DEMONSTRATE WORK ETHICS AND BEHAVIOR

Y 001 Identify established rules, regulations and policies
Y 002 Practice cost effectiveness
Y 003 Practice time management
Y 004 Assume responsibility for decisions and actions
Y 005 Exhibit pride
Y 006 Display initiative
Y 007 Display assertiveness
Y 008 Demonstrate a willingness to learn
Y 009 Identify the value of maintaining regular attendance
Y 010 Apply ethical reasoning

Z DEMONSTRATE TECHNOLOGICAL LITERACY

Z 001 Demonstrate basic keyboarding skills
Z 002 Demonstrate basic knowledge of computing
Z 003 Recognize impact of technological changes on tasks and people

AA MAINTAIN INTERPERSONAL RELATIONSHIPS

AA 001 Value individual diversity
AA 002 Respond to praise or criticism
AA 003 Provide constructive praise or criticism
AA 004 Channel and control emotional reactions
AA 005 Resolve conflicts
AA 006 Display a positive attitude
AA 007 Identify and react to sexual intimidation/harassment

BB DEMONSTRATE TEAM WORK

BB 001 Identify style of leadership used in team work
BB 002 Match team member skills and group activity
BB 003 Work with team members
BB 004 Complete a team task
BB 005 Evaluate outcomes

Primary Occupations Addressed by this Program

Electronics Assembler
Electronics Inspector
Electronics Mechanic
Electronics Tester
Instrument Inspector

Facilities

The facilities, equipment, and supplies used in the program are representative of the current technology and applications of business and industry.

Program Cluster: Arts, Media, and Communication

GRAPHIC AND PRINTING COMMUNICATIONS

Program Title: Graphic and Printing Communications **CIP#: 48.02**

Program Description: This instructional program prepares individuals to apply technical knowledge and skills to plan, prepare and execute commercial and industrial visual image and print products using mechanical, electronic, and digital graphic and conventional printing equipment.

OCCUPATIONAL SKILLS

A PROCESS CUSTOMER ORDERS

A 001 Evaluate job specifications and furnish materials
A 002 Follow a job task sequence in their area of responsibility
A 003 Order materials needed
A 004 Document changes in specifications
A 005 Mark-up copy according to specifications
A 006 Prepare work order
A 007 Document materials costs
A 008 Document time spent on task
A 009 Document use of contracted services
A 010 Coordinate scheduling of work

B PRODUCE COMPOSITION

B 001 Prepare text for input
B 002 Prepare graphics for input
B 003 Keyboard manuscript
B 004 Scan manuscript
B 005 Scan graphic image
B 006 Input files from magnetic media
B 007 Input files from optical media
B 008 Receive files via telecommunications
B 009 Input graphics from video
B 010 Perform file format conversions
B 011 Check for spelling errors using software
B 012 Choose a graphic format
B 013 Crop graphics
B 014 Scale graphics
B 015 Rotate graphics
B 016 Apply reproduction specifications
B 017 Identify output media

B PRODUCE COMPOSITION (Cont'd)

B 018 Generate a proof print
B 019 Output final product
B 020 Follow quality control sign-off procedures

C CREATE TEXT AND PAGE LAYOUT

C 001 Select software package(s)
C 002 Prepare thumbnail sketches
C 003 Prepare rough sketch (sketch rough layouts)
C 004 Set up the format
C 005 Format the text
C 006 Create graphics
C 007 Place page elements
C 008 Identify color breaks/screens for pre-press
C 009 Make dummy layout of multipage product
C 010 Revise layout to customer/design specifications
C 011 Produce a comprehensive layout
C 012 Create paste-up/mechanical
C 013 Proofread text for content
C 014 Proof camera-ready art

D PERFORM CAMERA AND DARKROOM FUNCTIONS

D 001 Inspect the camera copy
D 002 Scale the camera copy
D 003 Select film, determine exposures, adjust and shoot the camera copy
D 004 Process the camera film
D 005 Inspect the camera film
D 006 Reassemble camera copy
D 007 Prepare darkroom chemicals
D 008 Produce line negative
D 009 Produce halftone negative
D 010 Produce line diffusion transfer print (line PMT)
D 011 Produce halftone diffusion transfer print (Halftone PMT)
D 012 Produce choke (shrink)
D 013 Produce spread
D 014 Produce reverse
D 015 Produce process and specialty tones
D 016 Composite negative
D 017 Make contact print

E PERFORM STRIP/IMAGE ASSEMBLY (ELECTRONIC OR MANUAL)(Cont'd)

E 001 Make/review impositions
E 002 Select image assembly materials
E 003 Prepare pin register materials for assembly
E 004 Draw off masters/layout
E 005 Organize the images
E 006 Position base art negatives
E 007 Create windows
E 008 Create masks
E 009 Select screen tints
E 010 Position films/digital images
E 011 Step and repeat images for assembly
E 012 Output films electronically
E 013 Opaque films
E 014 Strip single-sided flat
E 015 Strip work-and-turn flat
E 016 Strip work-and-tumble flat
E 017 Strip sheet-wise flat
E 018 Strip perfect-bound bookwork
E 019 Strip saddle-stitch bookwork

F PERFORM CONTACT PROCEDURES

F 001 Organize materials for contacting
F 002 Determine type of contact materials
F 003 Prepare pin register materials for contacting
F 004 Determine contact exposures
F 005 Expose the contacting material
F 006 Step and repeat images for contacting
F 007 Process the contacting material
F 008 Inspect the contact material
F 009 Produce choke
F 010 Produce spread

G PERFORM ELECTRONIC COLOR SEPARATING AND IMAGE ENHANCEMENTS

G 001 Inspect, scale, and prepare the copy for scanning
G 002 Scan the copy to film and/or disk
G 003 Process the scanner film(s)
G 004 Inspect the scanner film(s)
G 005 Dismount and reassemble the scanned copy
G 006 Determine and select enhancement method(s)
G 007 Change gradation range
G 008 Make color corrections

G PERFORM ELECTRONIC COLOR SEPARATING AND IMAGE ENHANCEMENTS (Cont'd)

G 009 Change contrast
G 010 Create special effects
G 011 Repair images
G 012 Remove/add/merge images
G 013 Update image files

H MAKE PROOFS AND PLATES

H 001 Determine proof type
H 002 Prepare for proofing material
H 003 Expose proofing material
H 004 Process the proof(s)
H 005 Insure that quality standards are met
H 006 Flat rule, trim, fold proof(s)
H 007 Determine type of plate material
H 008 Prepare plate for exposure
H 009 Expose the plate(s)
H 010 Process the plate(s)
H 011 Inspect the printing plate(s)
H 012 Prepare plate(s) for press

I PERFORM PRESS MAKE-READY

I 001 Read and interpret specifications on job jacket
I 002 Request paper and ink from in-house stock
I 003 Load paper and ink
I 004 Pack and mount plate on plate cylinder
I 005 Set up the press for sheet specifications
I 006 Pre-set ink fountain
I 007 Perform specialty set ups
I 008 Check fountain solution
I 009 Print make-ready sheets signatures
I 010 Change/repack blanket on press
I 011 Adjust register, color, ink/water balance
I 012 Get press "OK" before running

J RUN THE PRESS

J 001 Make-ready operation
J 002 Inspect ink rollers, dampening system, and printing image
J 003 Maintain registration, ink fountain levels, spray powder levels, and ink/water balance
J 004 Obtain optimum press speed
J 005 Load and unload stock

J RUN THE PRESS (Cont'd)

J 006 Obtain office/customer samples
J 007 Verify final count
J 008 Identify repair priorities
J 009 Run single color job
J 010 Run multiple color job
J 011 Run process color job

K PERFORM WASH-UP

K 001 Wash plates
K 002 Preserve plates
K 003 Remove ink and clean fountain
K 004 Wash ink off rollers
K 005 Remove glaze from rollers
K 006 Clean wash-up blades and pans
K 007 Wash blanket on press
K 008 Wipe down plate and bearer surfaces
K 009 Clean impression cylinder
K 010 Drain/clean water system
K 011 Desensitize water rollers
K 012 Refill solvent containers
K 013 Return plate to plate file

L PERFORM FINISHING OPERATIONS

L 001 Collate finished product
L 002 Stapling finished product
L 003 Perform plastic/metal binding
L 004 Perform saddle stitch binding
L 005 Perform perfect binding
L 006 Perform specialty binding
L 007 Cut paper
L 008 Perforate and/or score paper
L 009 Slit paper
L 010 Perform die cutting
L 011 Perform embossing and debossing and stamping
L 012 Perform sequential numbering
L 013 Drill stock
L 014 Perform padding operation
L 015 Perform wrapping/packaging operation
L 016 Perform make-ready on folding and perforating equipment
L 017 Run the job
L 018 Perform quality control checks
L 019 Perform single folding operations
L 020 Perform multiple folding operations

M MAINTAIN TOOLS AND EQUIPMENT

M 001 Follow written maintenance procedures/schedules
M 002 Schedule routine service
M 003 Clean equipment
M 004 Calibrate equipment
M 005 Test the equipment
M 006 Troubleshoot equipment malfunctions
M 007 Perform minor mechanical adjustments or repairs
M 008 Provide for emergency repairs
M 009 Keep maintenance logs
M 010 Clean and organize work areas
M 011 Maintain processors
M 012 Maintain chemistries
M 013 Maintain standard inventory levels
M 014 Dispose of waste materials according to local state, and federal regulations
M 015 Determine basic maintenance procedures (press)
M 016 Lubricate equipment
M 017 Check fluid levels
M 018 Clean side frames
M 019 Protect the physical environment to maintain electronic equipment

N MAINTAIN FILES AND RECORDS

N 001 Prepare daily time-sheets
N 002 Requisition supplies
N 003 Complete job status reports
N 004 Complete equipment failure/maintenance reports
N 005 Document spoilage/waste
N 006 Maintain customer's job records
N 007 Follow established filing system (manual and electronic)
N 008 Maintain file library (manual & electronic)
N 009 Save files to optical/magnetic media
N 010 Perform regular back-ups of electronic files
N 011 Purge files and records periodically
N 012 Install computer/software upgrades

O FUNCTION IN THE WORK ENVIRONMENT

O 001 Report problems to supervisor
O 002 Provide technical assistance to others for planning job
O 003 Coordinate resource use with co-workers
O 004 Report deviations from job plan to supervisor
O 005 Update technical skills
O 006 Comply with company policies and procedures
O 007 Coordinate work flow with other staff department/providers
O 008 Follow instructions

O FUNCTION IN THE WORK ENVIRONMENT (Cont'd)

O 009 Participate in meetings
O 010 Evaluate new products and equipment
O 011 Assist in the training of new personnel
O 012 Supervise his/her crew where applicable
O 013 Maintain presentable appearance
O 014 Provide feedback to management concerning product/process improvements
O 015 Complete accident/safety reports
O 016 Comply with MOSHA/OHSA rules
O 017 Comply with shop rules
O 018 Comply with equipment usage rules
O 019 Participate in safety training activities
O 020 Correct unsafe conditions
O 021 Apply basic emergency first aid
O 022 Access network systems

FOUNDATION SKILLS

P LANGUAGE ARTS

P 001 Adapts diction/structure audience
P 002 Adapts strategy listening, reading, speaking, writing
P 003 Applies/uses figures of speech
P 004 Applies/uses study habits/methods previewing, prior knowledge
P 005 Attends directions/task
P 006 Collects/organizes information-oral/written classifications, written discussions
P 007 Collects/organizes information--oral/written library resources
P 008 Collects/organizes information--oral/written notes, written observations, outlines
P 009 Collects/organizes information--oral/written personal experiences, reading
P 010 Collects/organizes information--oral/written research--formal
P 011 Composes/edits notes
P 012 Composes/edits reports/essays information requests, information supplying
P 013 Composes/edits sentences adjectives, adverbs, capitalization
P 014 Composes/edits sentences completeness, direction/indirect object
P 015 Composes/edits sentences fragments--w/o
P 016 Composes/edits sentences irregular expressions--w/o
P 017 Composes/edits sentences modifiers, nouns, order of words, predicates, pronouns
P 018 Composes/edits sentences punctuation
P 019 Composes/edits sentences run-on--w/o
P 020 Composes/edits sentences spelling
P 021 Composes/edits sentences subject/verb agreement, subjects
P 022 Composes/edits sentences verbs
P 023 Comprehends information-oral assumptions/biases, cause/effect relationships
P 024 Comprehends information-oral conclusions, main idea, purpose
P 025 Comprehends information-oral rationale, varied types
P 026 Comprehends information-written cause/effect relationships, comparisons, contrasts
P 027 Comprehends information-written conclusions, evaluations/critiques

P LANGUAGE ARTS (Cont'd)

P 028 Comprehends information-written main idea, purpose, rationale
P 029 Comprehends information-written sequence, setting, written summaries
P 030 Evaluates information-oral adequacy/sufficiency
P 031 Evaluates information-oral appropriateness, clarity, conclusions/solutions
P 032 Evaluates information-oral fact/opinion
P 033 Evaluates information-oral non-print media
P 034 Evaluates information-oral relationship of ideas, relevant/irrelevant
P 035 Evaluates information-oral sources
P 036 Evaluates information-written adequacy/sufficiency
P 037 Evaluates information-written appropriateness, clarity, conclusions/solutions
P 038 Evaluates information-written fact/opinion, relationship of ideas,
P 039 Evaluates information-written relevant/irrelevant
P 040 Evaluates information-written sources, validity
P 041 Identifies information-oral explicit/implicit
P 042 Identifies information-oral key words/phrases
P 043 Identifies information-oral main idea
P 044 Identifies information-written abbreviations, written context, explicit/implicit
P 045 Identifies information-written irony/satire, key words/phrases
P 046 Identifies information-written main idea
P 047 Identifies information-written outcomes/solutions
P 048 Identifies purpose/strategy listening
P 049 Infers/predicts information-oral cause/effect relationships, character traits
P 050 Infers/predicts information-oral comparisons/contrasts, context, details, main idea
P 051 Infers/predicts information-oral outcomes/solutions, purpose, rationale
P 052 Infers/predicts information-written cause/effect relationships, comparisons/contrasts
P 053 Infers/predicts information-written context, details, main idea
P 054 Infers/predicts information-written outcomes/solutions, purpose, rationale
P 055 Infers/predicts information-written purpose, rationale
P 056 Presents informal speech information requests

Q MATHEMATICS

Q 001 Calculates/evaluates geometric figures area, measurement precision
Q 002 Calculates/evaluates percent in/decrease* markup/discount
Q 003 Computes addition decimals, fractions, mentally, mixed numbers, whole numbers
Q 004 Computes division decimals, fractions, mentally, mixed numbers, whole numbers
Q 005 Computes multiplication decimals, fractions, mentally, mixed numbers, whole numbers
Q 006 Computes subtraction decimals, fractions, mentally, mixed numbers, monomials
Q 007 Computes subtraction whole numbers
Q 008 Converts fractions mixed numbers
Q 009 Distinguishes deductive/inductive reasoning
Q 010 Distinguishes estimat/exact value
Q 011 Distinguishes proportion/congruence
Q 012 Estimates/rounds expected outcomes

Q MATHEMATICS (Cont'd)

Q 013 Estimates/rounds numbers add/subtract/divide/multiply
Q 014 Identifies fractions parts
Q 015 Identifies geometric figure circles/angles/arcs/polygons
Q 016 Identifies lines parallel/perpendicular
Q 017 Identifies missing/irrelevant data word problems
Q 018 Interprets charts/tables/graphs
Q 019 Interprets symbols <, >, =, e.g.
Q 020 Measures direct distance
Q 021 Solves problems proportion Area
Q 022 Understands geometric figures visual perception
Q 023 Uses calculator addition, division, multiplication, subtraction

R SCIENCE

R 001 Analyzes/evaluates environmental issues, impact statements, media information,
R 002 Analyzes/evaluates environmental issues pollution, waste management
R 003 Analyzes/evaluates experiments conclusions, controls, data, replications, samples
R 004 Analyzes/evaluates experiments sources of errors
R 005 Analyzes/evaluates experiments variables
R 006 Analyzes/evaluates natural resources, allocation, recovery, renewable/nonrenewable
R 007 Analyzes/evaluates natural resources utilization
R 008 Applies/uses laboratory techniques safety
R 009 Describes/explains acids/bases acid indicators, base indicators, ions, neutralization/salts
R 010 Describes/explains acids/bases pH
R 011 Describes/explains carbon/organic chemistry hydrocarbons--saturated/unsaturated
R 012 Describes/explains chemical reactions concentration, reactants
R 013 Describes/explains color blindness, color cones, color pigmentation
R 014 Describes/explains color rainbow, color rods, color spectrum
R 015 Describes/explains electricity currents--direct/alternating
R 016 Describes/explains electricity friction
R 017 Describes/explains force pressure, weight
R 018 Describes/explains heat temperature
R 019 Describes/explains light lasers, opaque, refraction, speed, translucent/transparent
R 020 Describes/explains matter density, divisibility, properties
R 021 Describes/explains solutions polar/non-polar, saturated/unsaturated, soluble/unsoluble
R 022 Describes/explains solutions solute, solvent
R 023 Describes/explains work levers
R 024 Identifies measurement unists
R 025 Measures pressure
R 026 Measures temperature F/C
R 027 Uses computers information processing, problem solving

WORKPLACE SKILLS

The Workplace Skills listed below were developed by Illinois and validated in 25 states, includi Maryland, for V-TECS (Vocational-Technical Education Consortium of States).

The MSDE Industry/Education Advisory Group determined that the * skills listed were most important for the Graphic and Printing Communications Industry.

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S 002 Match aptitudes to employment area *
S 003 Identify short term work goals *
S 004 Match attitudes to job area *
S 005 Match personality type to job area *
S 006 Match physical capabilities to job area *
S 007 Identify career information from counseling sources *
S 008 Demonstrate a drug-free status *

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T 001 Locate employment opportunities *
T 002 Identify job requirement *
T 003 Locate resources for finding employment *
T 004 Prepare a resume *
T 005 Prepare for job interview *
T 006 Identify conditions for employment *
T 007 Evaluate job opportunities *
T 008 Identify steps in applying for a job *
T 009 Write job application letter *
T 010 Write interview follow-up letter *
T 011 Complete job application form *
T 012 Identify attire for job interview *

U ACCEPT EMPLOYMENT

U 001 Apply for social security number *
U 002 Complete state and federal tax forms *
U 003 Accept or reject employment offer *
U 004 Complete Employee's Withholding Allowance Certificate Form W-4 *

V COMMUNICATE ON THE JOB

V 001 Communicate orally with others
V 002 Use telephone etiquette
V 003 Interpret the use of body language
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V 005 Follow written directions *
V 006 Ask questions about task *

W INTERPRET THE ECONOMICS OF WORK

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Y 003 Identify implementation procedures for a transition plan
Y 004 Evaluate the transition plan
Y 005 Exhibit ability to handle stress *
Y 006 Recognize need to change or quit a job *
Y 007 Write a letter of resignation *

Z SOLVE PROBLEMS AND THINK CRITICALLY

Z 001 Identify the problem *
Z 002 Clarify purposes and goals *
Z 003 Identify solutions to a problem and their impact *
Z 004 Employ reasoning skills *
Z 005 Evaluate options *
Z 006 Set priorities *
Z 007 Select and implement a solution to a problem *
Z 008 Evaluate results of implemented option *
Z 009 Organize workloads *
Z 010 Assess employer and employee responsibility in solving a problem *

AA MAINTAIN A SAFE AND HEALTHY WORK ENVIRONMENT

AA 001 Identify safety and health rules/procedures *
AA 002 Demonstrate the knowledge of equipment in the work place *
AA 003 Identify conservation and environmental practices and policies *
AA 004 Act during emergencies *
AA 005 Maintain work area *
AA 006 Identify hazardous substances in the work place *

BB DEMONSTRATE WORK ETHICS AND BEHAVIOR

BB 001 Identify established rules, regulations and policies *
BB 002 Practice cost effectiveness *
BB 003 Practice time management *
BB 004 Assume responsibility for decisions and actions *
BB 005 Exhibit pride *
BB 006 Display initiative *
BB 007 Display assertiveness *
BB 008 Demonstrate a willingness to learn *
BB 009 Identify the value of maintaining regular attendance *
BB 010 Apply ethical reasoning *

CC DEMONSTRATE TECHNOLOGICAL LITERACY

CC 001 Demonstrate basic keyboarding skills *
CC 002 Demonstrate basic knowledge of computing *
CC 003 Recognize impact of technological changes on tasks and people *

DD MAINTAIN INTERPERSONAL RELATIONSHIPS

DD 001 Value individual diversity *
DD 002 Respond to praise or criticism *
DD 003 Provide constructive praise or criticism *
DD 004 Channel and control emotional reactions *
DD 005 Resolve conflicts *
DD 006 Display a positive attitude *
DD 007 Identify and react to sexual intimidation/harassment *

EE DEMONSTRATE TEAM WORK

EE 001 Identify style of leadership used in team work
EE 002 Match team member skills and group activity
EE 003 Work with team members *
EE 004 Complete a team task *
EE 005 Evaluate outcomes *

Primary Occupations Addressed by this Program:

Electronic Publishing Technician
Typesetter
Graphic Designer
Commerical Artist
Prepress Technician

Facilities

The facilities, equipment, and supplies used in the program are representative of the current technology and applications of business and industry.

Program Cluster: Manufacturing, Engineering, and Technology

HEATING, AIR CONDITIONING, AND REFRIGERATION

Program Title: Heating, Air Conditioning, and Refrigeration CIP#: 47.02

Program Description:

This instructional program prepares individuals to apply technical knowledge and skills to repair, install, service and maintain the operating condition of heating, air conditioning, and refrigeration systems. It includes instruction in diagnostic techniques, the use of testing equipment, and the principles of mechanics, electricity, and electronics as they relate to the repair of heating, air conditioning and refrigeration systems.

OCCUPATIONAL SKILLS

A PREPARE FOR EQUIPMENT INSTALLATION

A 001 Determine location for exterior equipment
A 002 Determine thermostat location
A 003 Determine humidistat location
A 004 Determine if available electrical service is adequate
A 005 Determine type of mounting system required for equipment
A 006 Determine layout and size of refrigerant tubing
A 007 Determine size and routing of condensate drain
A 008 Determine size and routing of oil and gas piping
A 009 Acquire job materials
A 010 Insure installation conforms to code requirements

B INSTALL EQUIPMENT

B 001 Prepare equipment foundation/base
B 002 Install anchor in concrete
B 003 Install equipment vibration isolator pad
B 004 Install self-contained unit: wall mount
B 005 Install self-contained unit: roof mount
B 006 Install self-contained unit: pad mount and through wall
B 007 Install air-cooled condenser
B 008 Install water-cooled condenser
B 009 Install air-handling unit
B 010 Install humidifier
B 011 Install duct-mounted filter media/electronic air cleaner
B 012 Install evaporator in existing system
B 013 Install strip heater

B INSTALL EQUIPMENT (Cont'd)

B 014 Install booster fan
B 015 Install gas furnace
B 016 Install oil furnace
B 017 Install heat pump
B 018 Install oil tank
B 019 Install cooling tower
B 020 Install water pump
B 021 Install condensate pump
B 022 Install self-contained unit: through wall
B 023 Install evaporative-cooled condenser
B 024 Install evaporative cooler
B 025 Install water treatment system for water tower
B 026 Install precooler
B 027 Install baseboard heat
B 028 Install thermostat
B 029 Install humidistat
B 030 Install air door
B 031 Leak test system
B 032 Set V-belt tension
B 033 Align belt sheaves
B 034 Check motor current (amps) draw
B 035 Adjust gas pressure
B 036 Purge air from gas line
B 037 Adjust burner primary air on oil furnace
B 038 Adjust burner air on gas furnace
B 039 Adjust pilot flame
B 040 Adjust pilot igniter
B 041 Adjust direct spark igniter
B 042 Determine furnace efficiency through combustion analysis
B 043 Test for gas leaks
B 044 Adjust burner oil system
B 045 Adjust over-fire and stack draft
B 046 Test flame-proving and safety control
B 047 Fill water-cooled condenser and cooling tower
B 048 Adjust condenser water-flow controls
B 049 Install gas valve
B 050 Install primary safety control
B 051 Install zone systems for hydronic systems
B 052 Install zone systems for forced-air systems
B 053 Install economizer
B 054 Install make-up air system
B 055 Install dual-fuel (oil and wood) system
B 056 Install air-cooled condensing unit

C INSTALL DUCT SYSTEM

C 001 Modify existing plenum for evaporator installation
C 002 Modify existing duct for duct-mounted accessories installation
C 003 Install round metal duct to rectangular metal duct
C 004 Install rectangular metal duct and fittings
C 005 Install rectangular rigid fiberglass duct and fittings
C 006 Install manual air-flow damper
C 007 Install register or grill
C 008 Install fire damper
C 009 Install barometric damper
C 010 Install powered damper with actuator
C 011 Install factory-fabricated filter box on air-handling unit
C 012 Install duct liner
C 013 Install duct wrap
C 014 Install single-wall flue vent
C 015 Install vent damper
C 016 Install roof-top chimney vent termination assembly
C 017 Install double-wall chimney vent
C 018 Design duct system
C 019 Determine adequacy of the existing or designed duct system

D INSTALL PIPING AND TUBING

D 001 Determine type and location of fittings and in-line components
D 002 Connect pipe using threaded joint
D 003 Connect pipe using cemented joint
D 004 Connect tubing using compression fitting
D 005 Connect tubing using flare fitting
D 006 Connect tubing and fitting using soft-solder joint
D 007 Connect tubing using brazed joint
D 008 Make a tubing run with offset and corner using bending tool
D 009 Install pipe and tubing insulation and covering
D 010 Install refrigeration-line solenoid valve
D 011 Install in-line or angle hand valve
D 012 Install suction-line accumulator
D 013 Install suction/liquid-line heat exchanger
D 014 Install liquid receiver
D 015 Install fixed restriction/thermostatic expansion metering device
D 016 Install liquid/suction line filter-dryer
D 017 Install sight glass
D 018 Install pressure-regulator valve
D 019 Install head-pressure control valve
D 020 Install check valve
D 021 Install access valve
D 022 Install vibration isolator in refrigerant line

D INSTALL PIPING AND TUBING (Cont'd)

D 023 Install precharged factory line set
D 024 Install tubing or pipe clamps and supports
D 025 Install evaporator condensate drain line

E INSTALL AND REPAIR ELECTRICAL POWER AND CONTROL SYSTEMS

E 001 Hardwire unit to disconnect box
E 002 Verify circuit breaker and wiring size
E 003 Install equipment service disconnect
E 004 Install HVAC circuit breaker in service panel
E 005 Install rigid electrical conduit
E 006 Install wiring in rigid electrical conduit
E 007 Install Romex cable
E 008 Install low-voltage cable
E 009 Install outdoor, duct-mounted, or equipment-mounted thermostat
E 010 Install transformer
E 011 Install heat/smoke detector
E 012 Install relay
E 013 Replace defrost thermostat
E 014 Install/replace crankcase heater
E 015 Install oil-line heat tape
E 016 Hardwire connection to air handler
E 017 Install HVAC unit whip
E 018 Install flexible conduit

F PLACE SYSTEM IN OPERATION

F 001 Transfer refrigerant from storage bottle to Dial-A-Charge
F 002 Adjust hot-gas bypass
F 003 Calibrate thermostat and set heat anticipator
F 004 Adjust humidistat
F 005 Measure CFM air flow in duct
F 006 Measure pressure drop across coil or filter using manometer and probes
F 007 Measure air flow at register
F 008 Measure relative humidity
F 009 Adjust fan speed for correct operation and efficiency
F 010 Balance duct system for correct CFM at each register
F 011 Adjust fresh-air intake
F 012 Adjust bypass damper
F 013 Adjust relief damper
F 014 Check static pressure at fan discharge
F 015 Explain system operation to user
F 016 Explain maintenance requirements to user

F PLACE SYSTEM IN OPERATION (Cont'd)

F 017 Clean work site and make final inspection after job completion
F 018 Purge system of holding charge (Nitrogen)
F 019 Check aquastat for proper setting and operation
F 020 Check humidifier water feed and drain
F 021 Check safety drain in attic installation

G MAINTAIN AND REPAIR SYSTEM

G 001 Perform preventative maintenance
G 002 Install pressure switch (high, low, and oil)
G 003 Clean coils
G 004 Clean humidifier
G 005 Clean fan blades assembly
G 007 Replace fan pillow block bearing assembly
G 008 Replace and adjust V-belt
G 009 Replace and adjust V-belt sheave
G 010 Test compressor
G 011 Check refrigerant charge
G 012 Test compressor oil for acid and moisture
G 013 Replace compressor
G 014 Replace fan motor
G 015 Replace fan blade
G 016 Replace fan wheel (cage fan)
G 017 Replace motor mount
G 018 Replace evaporator or indoor coil
G 019 Replace condenser or outdoor coil
G 020 Replace gas regulator
G 021 Replace gas orifice
G 022 Replace gas burner
G 022 Replace gas heat exchanger
G 023 Replace pilot safety valve
G 030 Replace gas valve
G 031 Replace pilot burner
G 032 Replace oil burner (chassis and air tube)
G 033 Replace burner nozzle
G 034 Replace oil-burner motor
G 035 Replace fuel oil pump
G 036 Replace primary fan
G 037 Replace fuel cutoff valve
G 038 Replace fuel-filter cartridge
G 039 Acid clean condenser water circuit
G 040 Test and treat cooling-tower water
G 041 Replace water-pump seal

G MAINTAIN AND REPAIR SYSTEM (Cont'd)

G 042 Replace cooling-tower water-level control valve
G 043 Clean system after burnout
G 044 Clean furnace and components
G 045 Replace ignition electrodes
G 046 Estimate repair costs
G 047 Connect single-phase motor
G 048 Connect aluminum tubing using solderless connector
G 049 Replace four-way reversing valve
G 050 Replace metering device
G 051 Reverse rotation of single-phase motor
G 052 Connect three-phase motor
G 053 Install hard-start kit on hermetic compressor
G 054 Install magnetic coil in motor starter
G 055 Install motor contactor
G 056 Replace heat pump defrost timer
G 057 Replace pressure switch
G 058 Replace HVAC timer delay relay
G 059 Replace control switch (fan, temperature-limit, or fan and limit combination)
G 060 Replace gas valve
G 061 Replace pilot safety switch
G 062 Replace glow-coil assembly
G 063 Replace door switch (panel switch)
G 064 Replace thermocouple or thermopile
G 065 Replace stack-switch safety control
G 066 Replace flame-sensing electronic sensing device
G 067 Replace spark-ignition pilot lighter
G 068 Replace direct-spark igniter system
G 069 Repair spark-ignition control system
G 070 Replace relay
G 071 Replace starting or run capacitor
G 072 Replace potential relay
G 073 Install positive temperature coefficient (PTC) start device on a PSC motor
G 074 Replace motor overload protector
G 075 Replace electric-heater element
G 076 Replace electrostatic filter element
G 077 Replace solid-state control board
G 078 Replace solenoid coil
G 079 Evacuate refrigeration circuit to EPA specified level
G 080 Repair leak in refrigerant circuit
G 081 Add oil to compressor
G 082 Test for three-phase unbalance
G 083 Adjust compressor start-delay timer
G 084 Lubricate bearings
G 085 Derate gas furnace

G MAINTAIN AND REPAIR SYSTEM (Cont'd)

G 086 Derate oil furnace
G 087 Replace electric-heater sequencer
G 088 Charge system
G 089 Replace flame-retention ring
G 090 Repair circulating pump coupler
G 091 Repair circulating pump bearing assembly
G 092 Recover refrigerant

H FABRICATE DUCT AND FITTINGS

H 001 Fabricate rectangular trunk line duct
H 002 Fabricate plenum
H 003 Fabricate transition
H 004 Fabricate elbow
H 005 Fabricate offset
H 006 Fabricate sled with turning vanes
H 007 Fabricate floor pan
H 008 Fabricate filter sled

I INSTALL HYDRONIC SYSTEMS

I 001 Install circulator pump
I 002 Install three-way diverter valve
I 003 Install hydronic furnace
I 004 Install automatic feeder
I 005 Install expansion tank
I 006 Install zone valves
I 007 Install air vent
I 008 Install pressure relief valve
I 009 Fill hydronic system

J PERFORM CUSTOMER AND PROFESSIONAL ACTIVITIES

J 001 Recommend purchase or service
J 002 Prepare estimate(s)
J 003 Explain national, state, and local building, safety, and environmental codes
J 004 Explain product and service warranties
J 005 Prepare invoice
J 006 Collect charges
J 007 Placate irate customer
J 008 Explain operational and maintenance requirements to customer

K PERFORM DIAGNOSTIC PROCEDURES*

K 001 Troubleshoot air-conditioning system
K 002 Troubleshoot AC system with electric heat
K 003 Troubleshoot heat pump system
K 004 Troubleshoot heat pump system with fossil fuel heat
K 005 Troubleshoot gas pack
K 006 Troubleshoot gas furnace
K 007 Troubleshoot electric furnace
K 008 Troubleshoot oil furnace
K 009 Troubleshoot hydronic system
K 010 Troubleshoot cooling-tower system
K 011 Troubleshoot chilled-water system
K 012 Troubleshoot evaporative cooler
K 013 Troubleshoot heating and cooling system accessories

* Adapted from the Heating, Air Conditioning, and Refrigeration Technicians National Skills Standards Project, 1994, V-TECS, Southern Association of Colleges, Decatur, GA.

FOUNDATION SKILLS

L LANGUAGE ARTS

L 001 Adapt strategy for listening, speaking
L 002 Attends directions/task
L 003 Attends nonverbal cues
L 004 Attends verbal cues
L 005 Collects/organizes information-oral/written, observations, personal experiences
L 006 Composes/edits drafts-oral/written
L 007 Comprehends information--oral, assumptions/biases, conclusions
L 008 Comprehends information-written, cause/effect relationships
L 009 Comprehends information-written comparisons/contrasts
L 010 Comprehends information-written conclusions, evaluations/critiques
L 011 Comprehends information-written main idea, purpose, sequence
L 012 Evaluate information - oral adequacy/sufficiency, sources
L 013 Evaluates information-written adequacy/sufficiency
L 014 Identifies purpose/strategy Reading
L 015 Uses text resources, glossaries, indexes, table of contents

M MATHEMATICS

M 001 Calculates/evaluates geometric figures volume
M 002 Calculates/evaluates percent in/decrease* markup/discount
M 003 Computes mixed numbers, addition, division, multiplication, subtraction
M 004 Converts units

M MATHEMATICS (Cont'd)

M 005 Distinguishes angles/circles/arcs
M 006 Distinguishes estimate/exact value
M 007 Identifies geometric figures
M 008 Identifies lines parallel/perpendicular
M 009 Identifies lines vertical/horizontal
M 010 Interprets charts/tables/graphs
M 011 Interprets symbols <* >* =* e.g.
M 012 Measures direct angles
M 013 Measures direct distance
M 014 Measures direct volume
M 015 Solves problems generate conclusions deductive reasoning
M 016 Understands geometric figures visual perception
M 017 Understands line/angle relationships
M 018 Uses calculator formulas

N SCIENCE

N 001 Analyzes/evaluates environmental issues, science technology products
N 002 Applies/uses maps/charts/tables/graphs
N 003 Applies/uses scientific methods
N 004 Applies/uses scientific methods observation--direct/indirect
N 005 Describes/explains chemical reactions, concentration
N 006 Describes/explains electricity, conductors/insulators, current--direct/alternating
N 007 Describes/explains electricity ground, parallel/series circuits
N 008 Describes/explains electricity short circuit
N 009 Describes/explains electricity--measurement, ammeter/voltmeter, ampere, fuse
N 010 Describes/explains electricity--measurement Ohm's law, resistance, voltage
N 011 Describes/explains elements/compounds combustion
N 012 Describes/explains force, pressure
N 013 Describes/explains heat, conduction/convection
N 014 Describes/explains heat insulation, temperature
N 015 Describes/explains light ultraviolet
N 016 Describes/explains weather/climate Barometric pressure, relative humidity
N 017 Describes/explains work levers
N 018 Identifies acids/bases
N 019 Identifies matter chemical properties
N 020 Identifies measurement units
N 021 Measures distance/length
N 022 Measures temperature F/C
N 023 Measures time
N 024 Measures volume liquids/solids

WORKPLACE SKILLS

The Workplace Skills listed below were developed by Illinois and validated in 25 states, including Maryland, for V-TECS (Vocational-Technical Education Consortium of States).

The MSDE Industry/Education Advisory Group determined that all of the skills listed were important for the Heating, Air Conditioning industry.

O DEVELOP AN EMPLOYMENT PLAN

O 001 Match interests to employment area
O 002 Match aptitudes to employment area
O 003 Identify short term work goals
O 004 Match attitudes to job area
O 005 Match personality type to job area
O 006 Match physical capabilities to job area
O 007 Identify career information from counseling sources
O 008 Demonstrate a drug-free status

P SEEK AND APPLY FOR EMPLOYMENT OPPORTUNITIES

P 001 Locate employment opportunities
P 002 Identify job requirements
P 003 Locate resources for finding employment
P 004 Prepare a resume
P 005 Prepare for job interview
P 006 Identify conditions for employment
P 007 Evaluate job opportunities
P 008 Identify steps in applying for a job
P 009 Write job application letter
P 010 Write interview follow-up letter
P 011 Complete job application form
P 012 Identify attire for job interview

Q ACCEPT EMPLOYMENT

Q 001 Apply for social security number
Q 002 Complete state and federal tax forms
Q 003 Accept or reject employment offer
Q 004 Complete Employee's Withholding Allowance Certificate Form W-4

R COMMUNICATE ON THE JOB

R 001 Communicate orally with others
R 002 Use telephone etiquette
R 003 Interpret the use of body language
R 004 Prepare written communication
R 005 Follow written directions
R 006 Ask questions about task

S INTERPRET THE ECONOMICS OF WORK

S 001 Identify the role of business in the economic system
S 002 Describe responsibilities of employee
S 003 Describe responsibilities of employer or management
S 004 Investigate opportunities and options for business ownership
S 005 Assess entrepreneurship skills

T MAINTAIN PROFESSIONALISM

T 001 Participate in employment orientation
T 002 Assess business image, products and/or services
T 003 Identify positive behavior
T 004 Identify company dress and appearance standards
T 005 Participate in meetings
T 006 Identify work-related terminology
T 007 Identify how to treat people with respect

U ADAPT AND COPE WITH CHANGE

U 001 Identify elements of job transition
U 002 Formulate transition plan
U 003 Identify implementation procedures for a transition plan
U 004 Evaluate the transition plan
U 005 Exhibit ability to handle stress
U 006 Recognize need to change or quit a job
U 007 Write a letter of resignation

V SOLVE PROBLEMS AND THINK CRITICALLY

V 001 Identify the problem
V 002 Clarify purposes and goals
V 003 Identify solutions to a problem and their impact
V 004 Employ reasoning skills
V 005 Evaluate options
V 006 Set priorities
V 007 Select and implement a solution to a problem
V 008 Evaluate results of implemented option
V 009 Organize workloads
V 010 Assess employer and employee responsibility in solving a problem

W MAINTAIN A SAFE AND HEALTHY WORK ENVIRONMENT

W 001 Identify safety and health rules/procedures
W 002 Demonstrate the knowledge of equipment in the work place
W 003 Identify conservation and environmental practices and policies
W 004 Act during emergencies
W 005 Maintain work area
W 006 Identify hazardous substances in the work place

X DEMONSTRATE WORK ETHICS AND BEHAVIOR

X 001 Identify established rules, regulations and policies
X 002 Practice cost effectiveness
X 003 Practice time management
X 004 Assume responsibility for decisions and actions
X 005 Exhibit pride
X 006 Display initiative
X 007 Display assertiveness
X 008 Demonstrate a willingness to learn
X 009 Identify the value of maintaining regular attendance
X 010 Apply ethical reasoning

Y DEMONSTRATE TECHNOLOGICAL LITERACY

Y 001 Demonstrate basic keyboarding skills
Y 002 Demonstrate basic knowledge of computing
Y 003 Recognize impact of technological changes on tasks and people

Z MAINTAIN INTERPERSONAL RELATIONSHIPS

Z 001 Value individual diversity
Z 002 Respond to praise or criticism
Z 003 Provide constructive praise or criticism
Z 004 Channel and control emotional reactions
Z 005 Resolve conflicts
Z 006 Display a positive attitude
Z 007 Identify and react to sexual intimidation/harassment

AA DEMONSTRATE TEAM WORK

AA 001 Identify style of leadership used in team work
AA 002 Match team member skills and group activity
AA 003 Work with team members
AA 004 Complete a team task
AA 005 Evaluate outcomes

Primary Occupations Addressed by this Program

Air Conditioning Mechanic
Air Conditioning Installer
Heating Equipment Mechanic
Refrigeration Mechanic
Ventilation Equipment Mechanic
Environmental Systems Mechanic

Facilities

The facilities, equipment, technology and supplies used in this program are representative of the current technology and applications of the industry.

Program Cluster: Environmental and Natural Resource Systems

HORTICULTURE

Program Title: Horticulture CIP#: 01.06

Program Description:

This instructional program prepares individuals to produce, process, and market plants, shrubs, and trees used principally for ornamental, recreational, and aesthetic purposes and to establish, maintain, and manage horticultural enterprises such as arboriculture, floriculture, greenhouse operation and management, landscaping, nursery operation and management, and turf management. This program includes instruction in machinery and equipment necessary for each horticultural enterprise.

Skills Key:
- A-F - Horticulture Services Operations Core Skills (pages 1-3)
- NG - Nursery/Greenhouse Worker (pages 4-6)
- LT - Landscape Technician (pages 7-8)
- RF - Retail Florist (pages 8-10)
- GC - Garden Center Personnel (page 10-11)
- I L - Interior Landscaper (page 11-12)

OCCUPATIONAL SKILLS

HORTICULTURE CORE LIST

A MARKET PRODUCTS AND SERVICES

A 001 Maintain customer relations
A 002 Determine customer needs
A 003 Deliver products to customer
A 004 Display retail products
A 005 Price horticultural products
A 006 Prepare sales invoice/sales slip
A 007 Operate cash register
A 008 Complete daily sales reports
A 009 Call merchandise orders to manager
A 010 Write customer's telephone orders
A 011 Explain warranties/guarantees, pricing, credit, and delivery to customers
A 012 Compute sales tax
A 013 Verify credit
A 014 Stock merchandise displays

A MARKET PRODUCTS AND SERVICES (Cont'd)

A 015 Process customer complaints
A 016 Set up manufacturers' displays
A 017 Maintain signage
A 018 Explain maintenance & plant care instructions to clients
A 019 Suggest alternative choices
A 020 Suggest add-on sales

B MAINTAIN AN INVENTORY

B 001 Maintain horticulture supply and stock inventory
B 002 Maintain equipment inventory
B 003 Store stock and supplies
B 004 Maintain plant inventory
B 005 Assemble shipping cartons
B 006 Package orders
B 007 Prepare invoices and shipping labels
B 008 Check invoices against orders
B 009 Load/Unload and check-off truck shipments
B 010 Check merchandise quality
B 011 Control light and water requirements

C APPLY SAFETY PRACTICE

C 001 Interpret Material Safety Data Sheets
C 002 Interpret chemical labels
C 003 Comply with OSHA/MOSHA safety requirements
C 004 Apply basic first aid
C 005 Participate in safety training programs
C 006 Use personal protection equipment
C 007 Store/transport all chemical safely
C 008 Dispose all chemicals and containers safely
C 009 Report personal injury and health/safety hazards
C 010 Use fire extinguisher
C 011 Maintain safe work environment
C 012 Maintain safety signage
C 013 Perform safety checks on equipment

D CARE FOR PLANTS

D 001 Receive and unpack plants
D 002 Clean/Grade plants
D 003 Grade cut flowers
D 004 Follow care/storage requirements
D 005 Maintain plants according to soil, water, and light requirements
D 006 Interpret simple plant tissue test

D CARE FOR PLANTS (Cont'd)

D 007 Perform/Interpret simple soil test
D 008 Calculate liquid fertilizer concentrations
D 009 Prepare fertilizer solution
D 010 Fertilizer plants
D 011 Inspect plants for pests
D 012 Identify insects
D 013 Identify diseases
D 014 Identify weeds
D 015 Spray plants for pest control
D 016 Identify spray damage
D 017 Remove weeds
D 018 Clean spray equipment after use (nozzle, tanks, hoses, etc.)

E MAINTAIN EQUIPMENT/FACILITY

E 001 Clean work and delivery areas
E 002 Dispose of waste materials
E 003 Wash windows and glass shelves
E 004 Perform routine facility maintenance and repair
E 005 Install low voltage lighting system
E 006 Clean equipment
E 007 Lubricate equipment
E 008 Perform preventive maintenance of equipment
E 009 Maintain hand tools and blades
E 010 Prepare equipment for off-season storage
E 011 Perform routine equipment maintenance and repairs
E 012 Maintain tool inventory and service records
E 013 Order repair parts and equipment
E 014 Recognize equipment failure

F PERFORM ADMINISTRATIVE FUNCTIONS

F 001 Determine daily assignments
F 002 Plan work orders
F 003 Supervise employees
F 004 Orient new employees
F 005 Train employees using demonstration performance method
F 006 Evaluate employee performance
F 007 Estimate labor requirements
F 008 Prepare reports

(End of Horticulture Core List)

NG NURSERY/GREENHOUSE WORKER

NG A PROPAGATE PLANTS, SEEDS, AND CUTTINGS

NG A 001 Follow planting schedule
NG A 002 Clean seeds
NG A 003 Prepare seeds for sowing
NG A 004 Sow seeds
NG A 005 Maintain sterile equipment and environment
NG A 006 Prepare plants and cuttings for propagation
NG A 007 Take cuttings
NG A 008 Apply rooting hormone
NG A 009 Apply growth regulator to cuttings
NG A 010 Stick cuttings
NG A 011 Label cuttings and seedlings
NG A 012 Plant bulbs, corms, tubers, and tuberous roots
NG A 013 Monitor seed and cutting development
NG A 014 Transplant cuttings and seedlings

NG B MAINTAIN PLANT DEVELOPMENT

NG B 001 Follow production schedule
NG B 002 Prune plants
NG B 003 Perform root pruning
NG B 004 Dis-bud plants
NG B 005 Establish plant spacing
NG B 006 Re-pot plants
NG B 007 Thin seedlings
NG B 008 Assess nutrient deficiencies
NG B 009 Line-out trees and shrubs
NG B 010 Cultivate plants
NG B 011 Monitor plant growth
NG B 012 Provide winterization of plants

NG C APPLY WATER

NG C 001 Evaluate water requirements
NG C 002 Calculate water rates
NG C 003 Adjust water temperature and pressure
NG C 004 Irrigate field grown plants
NG C 005 Irrigate container grown plants
NG C 006 Set time clocks for mist system

NG D APPLY FERTILIZER

NG D 001 Calculate fertilizer rates
NG D 002 Calibrate fertilizer application equipment
NG D 003 Mix fertilizers
NG D 004 Apply soluble fertilizers
NG D 005 Apply granular fertilizer
NG D 006 Treat nutrient deficiencies
NG D 007 Maintain fertilizer records

NG E PREPARE SOIL AND GROWING MEDIA

NG E 001 Choose appropriate media
NG E 002 Test soil sample
NG E 003 Calculate rates of additives
NG E 004 Adjust ph of growing media
NG E 005 Mix growing media
NG E 006 Sterilize media with chemical soil sterilant
NG E 007 Incorporate fertilizer into growing media
NG E 008 Fill containers
NG E 009 Till soil
NG E 010 Prepare seedbed

NG F MONITOR THE GROW ENVIRONMENT

NG F 001 Implement Integrated Pest Management program
NG F 002 Control growing structure light intensity
NG F 003 Regulate growing structure temperature
NG F 004 Regulate growing structure humidity
NG F 005 Apply mulches
NG F 006 Perform soil tests
NG F 007 Prepare water samples

NG G PREPARE PLANTS FOR MARKETING

NG G 001 Grade plants
NG G 002 Ball and burlap trees and shrubs
NG G 003 Dig bulbs and corms
NG G 004 Harvest bare root trees and shrubs
NG G 005 Condition plants
NG G 006 Stake plants
NG G 007 Prepare plants for shipment
NG G 008 Store floral products until marketing

NG H PERFORM SALES-RELATED DUTIES

NG H 001 Arrange delivery of merchandise
NG H 002 Process customer returns
NG H 003 Maintain customer file system
NG H 004 Suggest cultural practices to customers
NG H 005 Identify customer price
NG H 006 Rotate horticulture and nursery products
NG H 007 Evaluate plant varieties

NG I APPLY CHEMICALS

NG I 001 Time chemical applications
NG I 002 Calculate pesticide concentrations
NG I 003 Calibrate chemical equipment
NG I 004 Mix chemicals
NG I 005 Apply soluble chemicals for pest control
NG I 006 Apply granular pesticides
NG I 007 Fumigate plants for pest control
NG I 008 Control growth rate by applying retardant
NG I 009 Maintain pesticide applicator
NG I 010 Maintain chemical records
NG I 011 Assess treatment results.
NG I 012 Pass State certification.

NG J PERFORM SERVICE AND MAINTENANCE

NG J 001 Maintain irrigation systems.
NG J 002 Maintain growing structure heating system.
NG J 003 Maintain growing structure cooling system.
NG J 004 Maintain grounds.
NG J 005 Service engine oil and filters.
NG J 006 Perform minor engine tune-up.
NG J 007 Glaze or recover greenhouse structures.
NG J 008 Perform maintenance inspection of facilities.
NG J 009 Monitor fuel consumption.

(End of Nursery/Greenhouse Worker list)

LANDSCAPE TECHNICIAN

LT A PREPARE SOIL AND PLANT MEDIA

LT A 001 Grade planting area
LT A 002 Install swales
LT A 003 Mark off location of beds
LT A 004 Prepare seed bed
LT A 005 Amend soil
LT A 006 Shape of form beds
LT A 007 Mark off planting spaces

LT B MAINTAIN LANDSCAPE

LT B 001 Control growth rate by applying retardant
LT B 002 Service sprinkler system by replacing valves and gaskets
LT B 003 Cultivate plants
LT B 004 Edge beds
LT B 005 Re-apply mulches
LT B 006 Prune plants
LT B 007 Manage turf
LT B 008 Aerate compacted soil
LT B 009 Report disease and spray damage

LT C APPLY FERTILIZER AND CHEMICALS

LT C 001 Calculate fertilizer and chemical applications
LT C 002 Calibrate fertilizer and application equipment
LT C 003 Test soil
LT C 004 Treat diseased plants, bulbs, and corms
LT C 005 Assess/treat plant nutrient deficiencies
LT C 006 Assess/treat chemical damage
LT C 007 Calibrate chemical equipment
LT C 008 Mix chemicals
LT C 009 Time chemical applications
LT C 010 Select chemicals for specific problems
LT C 011 Apply fertilizer using watering system
LT C 012 Maintain fertilizer and chemical inventory and records
LT C 013 Use Integrated Pest Management techniques (I.P.M.)

LT D INSTALL LANDSCAPES

LT D 001 Read landscape plan
LT D 002 Obtain plants
LT D 003 Select materials for job site
LT D 004 Obtain equipment
LT D 005 Follow landscape plan

LT D INSTALL LANDSCAPES (Cont'd)

LT D 006 Transplant trees & shrubs
LT D 007 Identify and plant trees
LT D 008 Identify and plant shrubs
LT D 009 Identify and plant ground covers, bedding plants, and bulbs
LT D 010 Identify and plant in aquatic environment
LT D 011 Identify and install lawns (sod/seed)
LT D 012 Complete final site inspection

LT E CONSTRUCT LANDSCAPE FEATURES

LT E 001 Construct sidewalks using various media
LT E 002 Build patios using various media
LT E 003 Build retaining walls using various media
LT E 004 Build landscaping structures using wood, masonry, and stone
LT E 005 Install drainage systems
LT E 006 Install fencing
LT E 007 Install sprinkler heads, nozzles and other irrigation equipment
LT E 008 Control erosion
LT E 009 Construct water features
LT E 010 Perform maintenance inspection of facilities
LT E 011 Maintain landscape construction
LT E 012 Prepare field reports
LT E 013 Call Ms. Utility

(End of Landscape Technician list)

RETAIL FLORIST

RF A PREPARE FLORAL AND PLANT DESIGN

RF A 001 Inspect flowers upon shop use
RF A 002 Prioritize design production to correspond with delivery times
RF A 003 Select materials consistent with pricing policies
RF A 004 Select design aids
RF A 005 Make bows
RF A 006 Wire flowers
RF A 007 Tint floral products
RF A 008 Design geometric arrangements
RF A 009 Design bud vases
RF A 010 Design novelty arrangements
RF A 011 Design a corsage and boutonniere
RF A 012 Design a nosegay
RF A 013 Design a bridal bouquet
RF A 014 Design a sympathy arrangement

RF A PREPARE FLORAL AND PLANT DESIGN (Cont'd)

RF A 015 Design a casket spray
RF A 016 Design casket lid arrangements
RF A 017 Design a standing spray
RF A 018 Design a fruit arrangement
RF A 019 Design ornamental dish gardens
RF A 020 Decorate potted plants and dish gardens
RF A 021 Design permanent material arrangements
RF A 022 Prepare holiday and special occasion decorations
RF A 023 Prepare lettered ribbon
RF A 024 Store products until delivery
RF A 025 Perform on-site set ups

RF B CARE FOR CUT FLOWERS AND CUT FOLIAGE

RF B 001 Unpack flowers
RF B 002 Inspect flowers upon delivery
RF B 003 Condition flowers
RF B 004 Follow storage requirements
RF B 005 Date flowers
RF B 006 Rotate cut materials

RF C CONDUCT RETAIL FLORIST SALES

RF C 001 Conduct wedding / funeral consultation
RF C 002 Lead the customer to accept on-hand materials
RF C 003 Process wire orders (phone, fax, electronic equipment)
RF C 004 Recommend plants for various sites
RF C 005 Package customer purchase
RF C 006 Process customer returns

RF D DELIVER PRODUCTS

RF D 001 Attach care cards to arrangements and plants
RF D 002 Prepare delivery labels
RF D 003 Package products for delivery
RF D 004 Locate delivery sites
RF D 005 Make delivery
RF D 006 Follow policy for non-deliveries
RF D 007 Follow delivery manifest

RF E MARKET PRODUCTS

RF E 001 Set up in-shop and window displays
RF E 002 Group by product compatibility
RF E 003 Maintain display
RF E 004 Maintain coolers
RF E 005 Open/Close out store or department
RF E 006 Maintain customer file system
RF E 007 Access trade information
RF E 008 Follow shop policies and procedures

(End of Retail Florist list)

GARDEN CENTER PERSONNEL

GC A PERFORM SALES-RELATED DUTIES

GC A 001 Open/Close register
GC A 002 Relay customer requests for special merchandise
GC A 003 Process sales (cash, check, credit, layaway, etc.)
GC A 004 Process return
GC A 005 Process special order
GC A 006 Weight out bulk merchandise
GC A 007 Provide customers with horticultural information
GC A 008 Provide customers with merchandise/product information
GC A 009 Set up and display merchandise
GC A 010 Label merchandise (price, name, and care)
GC A 011 Conduct inventories
GC A 012 Record write offs

GC B PERFORM PLANT MAINTENANCE

GC B 001 Prepare potting mixture
GC B 002 Pot plants
GC B 003 Ball and burlap plants
GC B 004 Foil wrap plants
GC B 005 Prune plants
GC B 006 Treat diseased plants
GC B 007 Apply preventative pesticides
GC B 008 Apply fertilizer
GC B 009 Cull damaged or diseased plants
GC B 010 Maintain environmental conditions in greenhouse
GC B 011 Pass Certified Pest certification

GC C SHIPPING AND RECEIVING

GC C 001 Fill customer orders for shipping
GC C 002 Prepare orders for transport
GC C 003 Check received merchandise against invoice listings
GC C 004 Process returns
GC C 005 Store merchandise in designated area

GC D MAINTAIN GARDEN CENTER

GC D 001 Organize, clean, and sweep out-side grounds
GC D 002 Clean rest rooms
GC D 003 Clean/dust displays
GC D 004 Clean windows, doors, and counters
GC D 005 Clean respirators
GC D 006 Clean sprayers
GC D 007 Clean spreaders

(End of Garden Center Personnel list)

INTERIOR LANDSCAPER

IL A SERVICE LANDSCAPES

IL A 001 Determine plant needs
IL A 002 Prune/trim plant material
IL A 003 Rotate plants
IL A 004 Reapply top dressing
IL A 005 Apply needed chemicals
IL A 006 Cull damaged or diseased plants
IL A 007 Prepare service reports

IL B INSTALL LANDSCAPES

IL B 001 Read landscape plan
IL B 002 Obtain plants
IL B 003 Select materials for job site
IL B 004 Obtain equipment
IL B 005 Transport plants and materials
IL B 006 Follow landscape plan
IL B 007 Prepare planting area
IL B 008 Identify and install large plant material
IL B 009 Identify and install ground covers
IL B 010 Identify and install flowers

IL B INSTALL LANDSCAPES (Cont'd)

IL B 011 Install related landscape materials
IL B 012 Identify and install hanging plants
IL B 013 Install top dressing
IL B 014 Complete final site inspection

IL C DESIGN LANDSCAPES

IL C 001 Determine client's needs
IL C 002 Evaluate the job site
IL C 003 Select plants and materials
IL C 004 Determine planting methods
IL C 005 Draft the design
IL C 006 Finalize design
IL C 007 Draft bid proposal
IL C 008 Present bid proposal

IL D MANAGE CHEMICALS

IL D 001 Select chemicals for specific problems
IL D 002 Calculate fertilizer and chemical concentrations
IL D 003 Prepare chemicals for application
IL D 004 Time chemical applications
IL D 005 Maintain chemical inventory files and records
IL D 006 Pass State Certification

(End of Interior Landscaper list)

FOUNDATION SKILLS

G LANGUAGE ARTS

G 001 Appreciates author's style/approach mood/tone
G 002 Attends directions/task
G 003 Collects/organizes information-oral/written, classifications, discussions
G 004 Collects/organizes information--oral/written library resources
G 005 Collects/organizes information--oral/written notes, observations, outlines
G 006 Collects/organizes information--oral/written personal experiences, reading
G 007 Composes/edits agenda, forms/documents, notes, oral presentations
G 008 Composes/edits reports/essays, social communications/letters business
G 009 Comprehends information--oral
G 010 Comprehends information-written, character traits
G 011 Comprehends information-written charts/tables/graphs, sequence
G 012 Describes/explains perceptual effects
G 013 Evaluates information-oral, conclusions/solutions
G 014 Evaluates information-written, adequacy/sufficiency, clarity, sources
G 015 Identifies information-written, abbreviations, outcomes/solutions
G 016 Identifies purpose/strategy listening
G 017 Infers/predicts information-written outcomes/solutions
G 018 Presents formal speech
G 019 Presents informal speech information requests, information supplying
G 020 Presents informal speech interview
G 021 Uses library resources, text resources

H MATHEMATICS

H 001 Calculates/evaluates geometric figures area, volume
H 002 Calculates/evaluates measurement precision
H 003 Calculates/evaluates percent in/decrease* markup/discount
H 004 Calculates/evaluates unit measure price
H 005 Compute addition complex fractions, decimals, fractions
H 006 Compute addition mixed numbers, whole numbers
H 007 Compute division complex fractions, decimals, fractions, mixed numbers
H 008 Compute division whole numbers
H 009 Computes expected values
H 010 Compute multiplication complex fractions, decimals, fractions, mixed numbers
H 011 Compute multiplication whole numbers
H 012 Compute subtraction complex fractions, decimals, fractions, mixed numbers
H 013 Compute subtraction whole numbers
H 014 Constructs charts/tables/graphs
H 015 Constructs geometric figures
H 016 Constructs lines parallel/perpendicular
H 017 Converts decimals/fractions ratios/percents
H 018 Converts formula equivalent form

H MATHEMATICS (Cont'd)

H 019 Converts fractions simplest form
H 020 Converts units
H 021 Estimates/rounds expected outcomes
H 022 Estimates/rounds geometric figures area
H 023 Estimates/rounds numbers add/subtract/divide/multiply
H 024 Identifies lines
H 025 Interprets charts/tables/graphs
H 026 Measures direct
H 027 Solves problems proportion, area
H 028 Solves problems trial and error
H 029 Understands line/angle relationships
H 030 Understands number theory effect of extremes/median
H 031 Uses calculator addition, division, multiplication

I SCIENCE

I 001 Analyzes/evaluates chemicals in society, fertilizers
I 002 Analyzes/evaluates environmental issues, impact statements, waste management
I 003 Analyzes/evaluates experiments conclusions, data, inferences
I 004 Analyzes/evaluates natural resources allocation, utilization
I 005 Applies/uses laboratory instruments, techniques (safety)
I 006 Classifies matter
I 007 Describes/explains acids/bases pH, bacteria benefits, chemical reactions
I 008 Describes/explains conservation soil, water, wildlife, weathering
I 009 Describes/explains ecology, food webs
I 010 Describes/explains electricity conductors/insulators
I 011 Describes/explains electricity currents--direct/alternating
I 012 Describes/explains genetics zygote
I 013 Describes/explains heat coolant, heat temperature, light
I 014 Describes/explains organisms, energy capture/release
I 015 Describes/explains organisms life cycle
I 016 Describes/explains plants, fertilization
I 017 Describes/explains plants parts/functions, photosynthesis
I 018 Describes/explains plants water
I 019 Describes/explains weather/climate relative humidity
I 020 Identifies compounds--organic
I 021 Identifies cycles, weather

I SCIENCE

I 022 Identifies diseases
I 023 Identifies organisms, fungi, insects, plants
I 024 Measures distance/length
I 025 Measures electric currents
I 026 Measures mass/weight
I 027 Measures temperature F/C
I 028 Measures time
I 029 Measures volume liquids/solids
I 030 Uses computers mathematical applications

WORKPLACE SKILLS

The Workplace Skills listed below were developed by Illinois and validated in 25 states, including Maryland, for V-TECS (Vocational-Technical Education Consortium of States).

The MSDE Industry/Education Advisory Group determined that all of the skills listed were important for the Horticulture industry.

J DEVELOP AN EMPLOYMENT PLAN

J 001 Match interests to employment area
J 002 Match aptitudes to employment area
J 003 Identify short term work goals
J 004 Match attitudes to job area
J 005 Match personality type to job area
J 006 Match physical capabilities to job area
J 007 Identify career information from counseling sources
J 008 Demonstrate a drug-free status

K SEEK AND APPLY FOR EMPLOYMENT OPPORTUNITIES

K 001 Locate employment opportunities
K 002 Identify job requirements
K 003 Locate resources for finding employment
K 004 Prepare a resume
K 005 Prepare for job interview
K 006 Identify conditions for employment
K 007 Evaluate job opportunities
K 008 Identify steps in applying for a job
K 009 Write job application letter
K 010 Write interview follow-up letter
K 011 Complete job application form
K 012 Identify attire for job interview

L ACCEPT EMPLOYMENT

L 001 Apply for social security number
L 002 Complete state and federal tax forms
L 003 Accept or reject employment offer
L 004 Complete Employee's Withholding Allowance Certificate Form W-4

M COMMUNICATE ON THE JOB

M 001 Communicate orally with others
M 002 Use telephone etiquette
M 003 Interpret the use of body language
M 004 Prepare written communication
M 005 Follow written directions
M 006 Ask questions about task

N INTERPRET THE ECONOMICS OF WORK

N 001 Identify the role of business in the economic system
N 002 Describe responsibilities of employee
N 003 Describe responsibilities of employer or management
N 004 Investigate opportunities and options for business ownership
N 005 Assess entrepreneurship skills

F MAINTAIN PROFESSIONALISM

F 001 Participate in employment orientation
F 002 Assess business image, products and/or services
F 003 Identify and model positive behavior**
F 004 Identify company dress and appearance standards
F 005 Participate in meetings
F 006 Identify work-related terminology
F 007 Identify how to treat people with respect
F 008 Exhibit appropriate conduct before clients/customers.**

G ADAPT AND COPE WITH CHANGE

G 001 Identify elements of job transition
G 002 Formulate transition plan
G 003 Identify implementation procedures for a transition plan
G 004 Evaluate the transition plan
G 005 Exhibit ability to handle stress
G 006 Recognize need to change or quit a job
G 007 Write a letter of resignation

H SOLVE PROBLEMS AND THINK CRITICALLY

H 001 Identify the problem
H 002 Clarify purposes and goals
H 003 Identify solutions to a problem and their impact
H 004 Employ reasoning skills
H 005 Evaluate options
H 006 Set priorities
H 007 Select and implement a solution to a problem
H 008 Evaluate results of implemented option
H 009 Organize workloads
H 010 Assess employer and employee responsibility in solving a problem

I MAINTAIN A SAFE AND HEALTHY WORK ENVIRONMENT

I 001 Identify safety and health rules/procedures
I 002 Demonstrate the knowledge of equipment in the work place
I 003 Identify conservation and environmental practices and policies
I 004 Act during emergencies
I 005 Maintain work area
I 006 Identify hazardous substances in the work place

J DEMONSTRATE WORK ETHICS AND BEHAVIOR

J 001 Identify established rules, regulations and policies
J 002 Practice cost effectiveness
J 003 Practice time management
J 004 Assume responsibility for decisions and actions
J 005 Exhibit pride
J 006 Display initiative
J 007 Display assertiveness
J 008 Demonstrate a willingness to learn
J 009 Identify the value of maintaining regular attendance
J 010 Apply ethical reasoning

K DEMONSTRATE TECHNOLOGICAL LITERACY

K 001 Demonstrate basic keyboarding skills
K 002 Demonstrate basic knowledge of computing
K 003 Recognize impact of technological changes on tasks and people

L MAINTAIN INTERPERSONAL RELATIONSHIPS

L 001 Value individual diversity
L 002 Respond to praise or criticism
L 003 Provide constructive praise or criticism
L 004 Channel and control emotional reactions
L 005 Resolve conflicts
L 006 Display a positive attitude
L 007 Identify and react to sexual intimidation/harassment

M DEMONSTRATE TEAM WORK

M 001 Identify style of leadership used in team work
M 002 Match team member skills and group activity
M 003 Work with team members
M 004 Complete a team task
M 005 Evaluate outcomes

Primary Occupations Addressed by this Program:

Arborist
Florist/Floral Designer
Garden Center Employee
Golf Course Employee
Greenhouse Employee
Grounds Maintenance Employee
Landscaper (interior and exterior)
Nursery Employee
Park Employee
Plant Propagator
Tree Surgeon
Turfgrass Producer/Specialist

Facilities:

The facilities, equipment, and supplies used in the program are representative of the current technology and applications of business and industry.

Program Cluster: Business Management and Finance

SECRETARIAL AND RELATED PROGRAMS

Program Title: Administrative and Secretarial Services CIP#: 52.04

Program Description:

This instructional program generally prepares individuals to perform the duties of administrative assistants and/or secretaries. Secretaries distribute information and prepare, transcribe, systematize and preserve written communications and records. Includes instruction in business communications, principles of business law, word processing and data entry, office machines operation and maintenance, office procedures, public relations, secretarial accounting, filing systems and records management, and report preparation.

Skills Key:
- A-G Secretary Core List - Entry Level (Pages 1-4)
- LS Legal Secretary (Pages 4-5)
- MS Medical Secretary (Pages 5-6)
- ES Executive Secretary (Pages 7-8)

OCCUPATIONAL SKILLS

SECRETARIAL & RELATED CORE LIST

A ORGANIZE AND PLAN FUNCTIONS

A 001 Maintain supervisor's appointment calendar
A 002 Make travel arrangements for supervisor
A 003 Establish an itinerary for supervisor
A 004 Maintain supervisor's photographs and biographical data*
A 005 Plan meetings
A 006 Plan physical layout of the office
A 007 Keep up to date with technical developments
A 008 Apply for Notary Public Commission
A 009 Maintain a to do list or daily log of employee's own activities
A 010 Arrange conferences*
A 011 Determine optimum process for reproduction of printed materials
A 012 Develop liaisons with organizations and community*
A 013 Plan for entertainment, receptions, or dinners*
A 014 Make transportation arrangements for guests*
A 015 Compose written directions
A 016 Organize own work

A ORGANIZE AND PLAN FUNCTIONS (Cont'd)

A 017 Log work in and out
A 018 Prepare budget for administrative services*
A 019 Determine distribution of materials
A 020 Conduct employee training
A 021 Explain office procedures
A 022 Maintain office procedures manual

B MAINTAIN EQUIPMENT AND SUPPLIES

B 001 Maintain inventory of software
B 002 Maintain inventory of office equipment and furniture
B 003 Maintain inventory of supplies
B 004 Schedule maintenance of office equipment
B 005 Demonstrate equipment use
B 006 Supervise installation of office equipment and furniture
B 007 Prepare cost justification for office equipment and furniture
B 008 Prepare cost justification for software
B 009 Purchase office equipment
B 010 Order supplies
B 011 Receive office equipment and supplies
B 012 Maintain inventory of forms
B 013 Clean word processing equipment
B 014 Load paper in computer printer
B 015 Change cartridge on printer
B 016 Change printwheel on printer
B 017 Add toner to photocopier
B 018 Clean printer
B 019 Store office equipment and supplies
B 020 Clear paper path on printer
B 021 Clean keyboard
B 022 Clean glass screen
B 023 Clean disk drive
B 024 Clean mouse

C PERFORM FINANCIAL FUNCTIONS

C 001 Maintain petty cash fund
C 002 Reconcile cash count and receipts
C 003 Prepare bank deposits
C 004 Complete purchase requisitions
C 005 Keep record of office expenses
C 006 Determine budgetary requirements
C 007 Complete vouchers for payment
C 008 Reconcile bank statements
C 009 Make journal entries
C 010 Reconcile journal
C 011 Prepare employer's travel voucher

D MANAGE RECORDS AND FILES

D 001 Maintain clippings file
D 002 Maintain tickler file
D 003 Maintain alphabetical filing system
D 004 Maintain numerical filing system
D 005 Maintain subject filing system
D 006 Maintain chronological file
D 007 Retrieve information from files
D 008 Transfer files
D 009 Search for lost materials in file
D 010 Maintain classified or confidential files
D 011 File materials
D 012 Maintain file of addresses and telephone numbers
D 013 Develop records management system
D 014 Maintain multimedia files (electronic diskettes, CDs, videos, microfiche, etc.)

E PERFORM INFORMATION PROCESS ACTIVITIES

E 001 Use business computer software
E 002 Utilize HELP function
E 003 Format fixed and floppy disk
E 004 Run CHKDSK or comparable command function
E 005 Utilize basic operating system commands
E 006 Create directory/subdirectory
E 007 Utilize directory
E 008 Install software
E 009 Create back-up
E 010 Create new documents
E 011 Revise existing documents
E 012 Insert and delete text
E 013 Merge text
E 014 Modify format

E PERFORM INFORMATION PROCESS ACTIVITIES (Cont'd)

E 015 Develop macros
E 016 Manipulate file
E 017 Rename file
E 018 Move information within package
E 019 Search/replace data
E 020 Use spellcheck
E 021 Use thesaurus
E 022 Print data
E 023 Create word processing index
E 024 Copy one diskette to another
E 025 Convert document from one system to another
E 026 Create spreadsheet

F PERFORM KEYBOARDING AND TRANSCRIBE

F 001 Key document from longhand
F 002 Key document from machine transcription
F 003 Key document from edited rough draft
F 004 Key mailing labels and envelopes
F 005 Key data to prepare graphs and charts
F 006 Key manuscripts
F 007 Proofread document for content, format, grammatical, and typographical error
F 008 Key agendas
F 009 Key correspondence using variable inserts
F 010 Key statistical documents
F 011 Complete preprinted forms
F 012 Key correspondence
F 013 Compose copy to be keyed
F 014 Take dictation in shorthand/speedwriting
F 015 Take dictation at the keyboard
F 016 Transcribe minutes of meetings
F 017 Transcribe dictation into mailable documents

G PERFORM CLERICAL ACTIVITIES

G 001 Act as Notary Public
G 002 Obtain notarization on documents
G 003 Answer incoming telephone call, take complete message
G 004 Place telephone call / deliver a message (live or recorded)
G 005 Keep telephone log
G 006 Transmit and monitor electronic mail
G 007 Send document via modem
G 008 Receive document via fax/modem
G 009 Send document via fax
G 010 Process incoming mail

G PERFORM CLERICAL ACTIVITIES (Cont'd)

G 011 Process out-going mail
G 012 Process mail through postage machine
G 013 Prepare packages for shipping
G 014 Handle specialized mail
G 015 Prepare correspondence and document for mailing
G 016 Compose handwritten draft of letter or other communication
G 017 Prepare report*
G 018 Paste-up materials to be printed
G 019 Send out greeting cards
G 020 Make photocopy of document
G 021 Assist client(s)/visitor(s)
G 022 Arrange for courier services

(End of Secretarial & Related Core List)

LEGAL SECRETARY (All skills except LA001 were determined to be advanced skills to be taught at the postsecondary level)

LS A PREPARE CLIENT DOCUMENTS

LS A 001 Type specific information on preprinted forms
LS A 002 Prepare agreements
LS A 003 Prepare contracts and leases
LS A 004 Prepare and process bills of sale
LS A 005 Prepare wills and codicils
LS A 006 Prepare deeds
LS A 007 Prepare mortgages
LS A 008 Prepare mortgages on pre-printed forms
LS A 009 Prepare promissory notes
LS A 010 Prepare powers of attorney
LS A 011 Prepare articles of incorporation
LS A 012 Prepare corporation minute books
LS A 013 Prepare stock certificates
LS A 014 Prepare marriage arrangements (i.e. pre- and anti-nuptial)
LS A 015 Prepare divorce decrees
LS A 016 Prepare property and settlement agreements

LS B PREPARE COURT DOCUMENTS

LS B 001	Prepare and mark court exhibits
LS B 002	Prepare adoption papers
LS B 003	Prepare affidavits
LS B 004	Prepare affidavits for motions and notice
LS B 005	Prepare answers
LS B 006	Prepare papers for bankruptcy
LS B 007	Prepare briefs
LS B 008	Prepare complaints
LS B 009	Prepare counterclaims/cross-claims
LS B 010	Prepare notices
LS B 011	Prepare requests for court judgements
LS B 012	Prepare motions
LS B 013	Prepare summons
LS B 014	Prepare public notices
LS B 015	Prepare orders
LS B 016	Prepare petitions
LS B 017	Prepare subpoenas
LS B 018	Prepare papers for probate court
LS B 019	Prepare final settlements of estates
LS B 020	Prepare papers for child support

LS C ORGANIZE LEGAL INFORMATION AND RECORDS

LS C 001	Locate information in legal reference materials
LS C 002	Contact informational sources
LS C 003	Type summaries of depositions
LS C 004	Type attorney's time analysis
LS C 005	Prepare invoice for depositions and court reports
LS C 006	Prepare statements to clients
LS C 007	Initiate and maintain client account records
LS C 008	Maintain file of legal forms
LS C 009	Schedule depositions
LS C 010	File documents in court
LS C 011	Schedule and assist in closings

(End of Legal Secretary list)

MEDICAL SECRETARY (All skills listed below were determined to be advanced skills to be taught at the postsecondary level)

MS A PROVIDE PATIENT SERVICES

MS A 001 Process patients
MS A 002 Assist patient to complete registration forms
MS A 003 Complete insurance forms
MS A 004 Schedule hospital admissions, out-patient surgery, and ancillary testing
MS A 005 Receive patients
MS A 006 Obtain emergency medical assistance for patients
MS A 007 Arrange for extended patient services
MS A 008 Open new patient account
MS A 009 Update patient records
MS A 010 Complete admitting forms
MS A 011 Complete discharge forms
MS A 012 Compile patient abstracts for insurance inquires

MS B PROCESS MEDICAL RECORDS

MS B 001 Key patient data in computer
MS B 002 Complete patient change of address procedure
MS B 003 Complete legal document procedures
MS B 004 Compile daily patient census
MS B 005 List entry into birth or death registry
MS B 006 Prepare a medical report
MS B 007 Transcribe reports for medical records
MS B 008 Code diagnosis and surgical procedures
MS B 009 Transfer codings from clinical records to abstract
MS B 010 Close patient file
MS B 011 Prepare medical record for microfilming

MS C MAINTAIN MEDICAL RECORDS AND EQUIPMENT

MS C 001 Schedule office appointments
MS C 002 Schedule medical staff appointments or activities
MS C 003 Maintain physician's on-call schedule
MS C 004 Schedule custodial or maintenance services
MS C 005 Complete employee insurance record
MS C 006 Store medical equipment and supplies

(End of Medical Secretary)

EXECUTIVE SECRETARY

ES A SUPERVISE PERSONNEL

ES A 001 Maintain file of job openings
ES A 002 Select and extend offer of employment
ES A 003 Publicize job opening
ES A 004 Interpret personnel policies
ES A 005 Review employee attendance records
ES A 006 Update administrative services procedures manual
ES A 007 Develop administrative services procedures manual
ES A 008 Handle employee problem and complaint
ES A 009 Evaluate employee's performance
ES A 010 Coordinate employee continuing education programs
ES A 011 Dismiss employee
ES A 012 Maintain employment records
ES A 013 Conduct staff meeting
ES A 014 Sign employer's mail
ES A 015 Dictate letter or other communication
ES A 016 Maintain individual employee production records
ES A 017 Develop staffing plan
ES A 018 Prepare vacation schedule
ES A 019 Establish employee performance standards
ES A 020 Establish work priorities for administrative services
ES A 021 Determine workload distribution schedule
ES A 022 Prepare job description
ES A 023 Interview applicant for employment
ES A 024 Orient new employee
ES A 025 Coordinate duties with other employees
ES A 026 Assign work to employee

ES B HANDLE ACCOUNTING FUNCTIONS

ES B 001 Accept payment on account
ES B 002 Process accounts payable invoice
ES B 003 Prepare office payroll
ES B 004 Prepare tax withholding reports
ES B 005 Approve bill (invoice) for payment

(End of Executive Secretary list)

FOUNDATION SKILLS

H LANGUAGE ARTS

H 001 Adapts diction/structure, audience, situation
H 002 Adapts strategy listening, reading, speaking
H 003 Attends directions/task
H 004 Attends nonverbal cues
H 005 Attends verbal cues
H 006 Collects/organizes information-oral/written
H 007 Composes/edits agenda
H 008 Composes/edits drafts-oral/written with consistency, proper tone
H 009 Composes/edits forms/documents, journals/diaries, notes, paragraphs
H 010 Composes/edits reports/essays
H 011 Composes/edits sentences
H 012 Composes/edits social communications/letters, business
H 013 Comprehends information-oral, purpose,
H 014 Comprehends information-written, purpose
H 015 Evaluates information-oral, written
H 016 Identifies function of words
H 017 Identifies point of view first/third person
H 018 Identifies purpose/strategy
H 019 Presents informal speech
H 020 Uses dictionary
H 021 Uses library resources
H 022 Uses text resources
H 023 Uses text resources indexes
H 024 Uses thesaurus

I MATHEMATICS

I 001 Calculates/evaluates percent in/decrease* markup/discount
I 002 Solves problems generate conclusions deductive reasoning
I 003 Understands definitions conditions
I 004 Uses calculator addition, multiplication, subtraction
I 005 Uses computers for information processing, mathematical applications

WORKPLACE SKILLS

The Workplace Skills listed below were developed by Illinois and validated in 25 states, including Maryland, for V-TECS (Vocational-Technical Education Consortium of States).

The MSDE Industry/Education Advisory Group determined that all of the skills listed were important for Secretarial and Related Programs.

J DEVELOP AN EMPLOYMENT PLAN

J 001 Match interests to employment area
J 002 Match aptitudes to employment area
J 003 Identify short term work goals
J 004 Match attitudes to job area
J 005 Match personality type to job area
J 006 Match physical capabilities to job area
J 007 Identify career information from counseling sources
J 008 Demonstrate a drug-free status

K SEEK AND APPLY FOR EMPLOYMENT OPPORTUNITIES

K 001 Locate employment opportunities
K 002 Identify job requirements
K 003 Locate resources for finding employment
K 004 Prepare a resume
K 005 Prepare for job interview
K 006 Identify conditions for employment
K 007 Evaluate job opportunities
K 008 Identify steps in applying for a job
K 009 Write job application letter
K 010 Write interview follow-up letter
K 011 Complete job application form
K 012 Identify attire for job interview

L ACCEPT EMPLOYMENT

L 001 Apply for social security number
L 002 Complete state and federal tax forms
L 003 Accept or reject employment offer
L 004 Complete Employee's Withholding Allowance Certificate Form W-4

M COMMUNICATE ON THE JOB

M 001 Communicate orally with others
M 002 Use telephone etiquette
M 003 Interpret the use of body language
M 004 Prepare written communication
M 005 Follow written directions
M 006 Ask questions about task

N INTERPRET THE ECONOMICS OF WORK

N 001 Identify the role of business in the economic system
N 002 Describe responsibilities of employee
N 003 Describe responsibilities of employer or management
N 004 Investigate opportunities and options for business ownership
N 005 Assess entrepreneurship skills

O MAINTAIN PROFESSIONALISM

O 001 Participate in employment orientation
O 002 Assess business image, products and/or services
O 003 Identify positive behavior
O 004 Identify company dress and appearance standards
O 005 Participate in meetings
O 006 Identify work-related terminology
O 007 Identify how to treat people with respect

P ADAPTING AND COPING WITH CHANGE

P 001 Identify elements of job transition
P 002 Formulate transition plan
P 003 Identify implementation procedures for a transition plan
P 004 Evaluate the transition plan
P 005 Exhibit ability to handle stress
P 006 Recognize need to change or quit a job
P 007 Write a letter of resignation

Q SOLVE PROBLEMS AND THINK CRITICALLY

Q 001 Identify the problem
Q 002 Clarify purposes and goals
Q 003 Identify solutions to a problem and their impact
Q 004 Employ reasoning skills
Q 005 Evaluate options
Q 006 Set priorities
Q 007 Select and implement a solution to a problem
Q 008 Evaluate results of implemented option
Q 009 Organize workloads
Q 010 Assess employer and employee responsibility in solving a problem

R MAINTAIN A SAFE AND HEALTHY WORK ENVIRONMENT

R 001 Identify safety and health rules/procedures
R 002 Demonstrate the knowledge of equipment in the work place
R 003 Identify conservation and environmental practices and policies
R 004 Act during emergencies
R 005 Maintain work area
R 006 Identify hazardous substances in the work place

S DEMONSTRATE WORK ETHICS AND BEHAVIOR

S 001 Identify established rules, regulations and policies
S 002 Practice cost effectiveness
S 003 Practice time management
S 004 Assume responsibility for decisions and actions
S 005 Exhibit pride
S 006 Display initiative
S 007 Display assertiveness
S 008 Demonstrate a willingness to learn
S 009 Identify the value of maintaining regular attendance
S 010 Apply ethical reasoning

T DEMONSTRATE TECHNOLOGICAL LITERACY

T 001 Demonstrate basic keyboarding skills
T 002 Demonstrate basic knowledge of computing
T 003 Recognize impact of technological changes on tasks and people

U MAINTAIN INTERPERSONAL RELATIONSHIPS

U 001 Value individual diversity
U 002 Respond to praise or criticism
U 003 Provide constructive praise or criticism
U 004 Channel and control emotional reactions
U 005 Resolve conflicts
U 006 Display a positive attitude
U 007 Identify and react to sexual intimidation/harassment

W DEMONSTRATE TEAM WORK

W 001 Identify style of leadership used in team work
W 002 Match team member skills and group activity
W 003 Work with team members
W 004 Complete a team task
W 005 Evaluate outcomes

Primary Occupations Addressed by this Program

Secretary
Administrative Assistant

Facilities

The facilities, equipment, and supplies used in the program are representative of the current technology and applications of this industry.